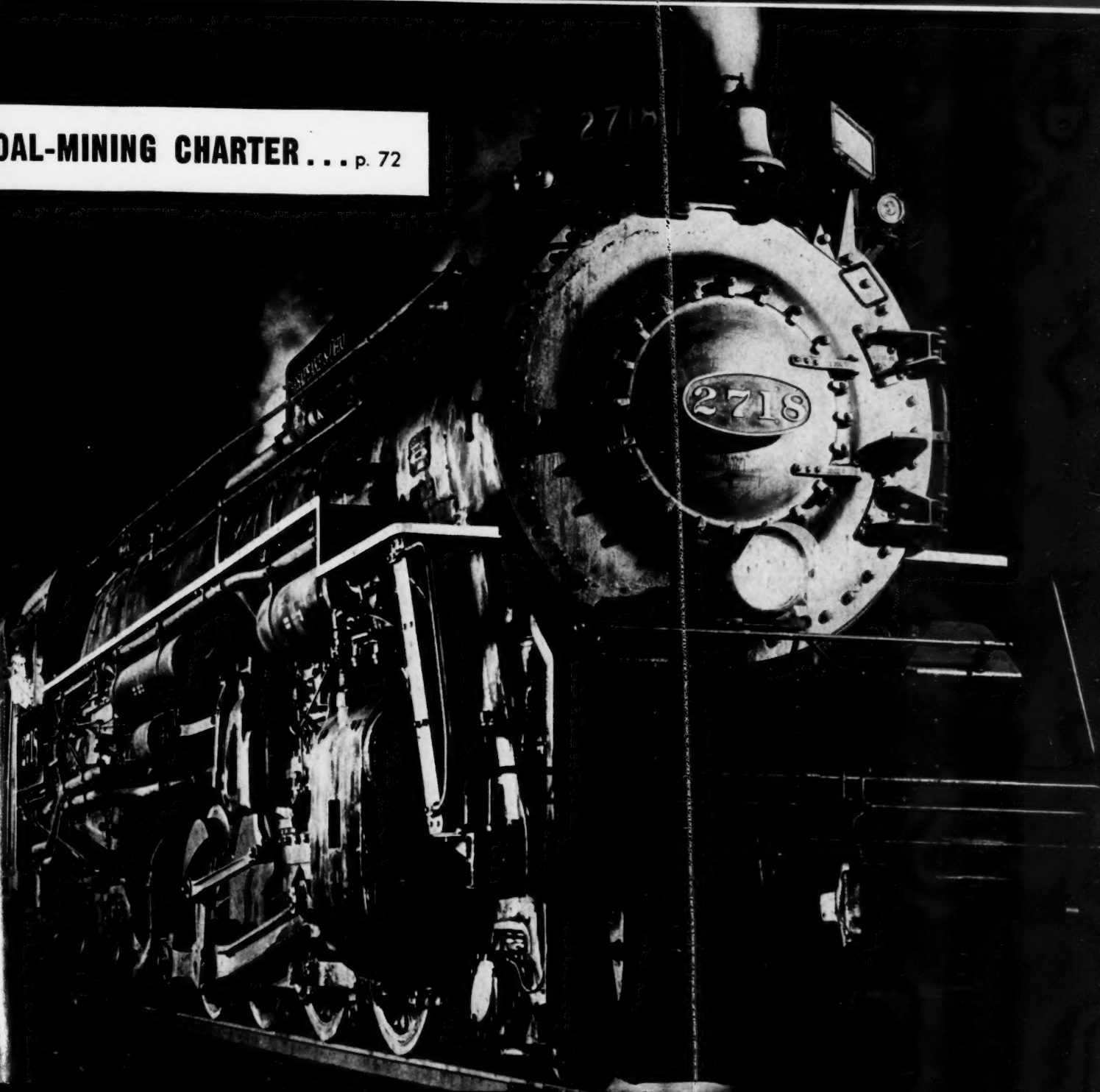


# Coal Age

JULY, 1946

COAL-MINING CHARTER . . . p. 72





**JOB  
PROVED**

## A SWITCH TO *Lower* COSTS

JR

v. 51<sup>2</sup>

July - Dec. 1946

### **SUN MINE LUBRICANTS ...**

**Keep Cars Rolling Easily; Cut Down Time Spent on Maintenance and Lubrication**

A big Pennsylvania mine was lubricating mine car bearings every other week. But the grease was separating and not providing adequate lubrication. Instead of being free and easy, cars were hard to push.

**Complaints stopped** when the mine changed to a special "Job-Proved" Sun grease. Now, cars are lubricated only three or four times a year, instead of every two weeks. They roll easily. There have been big savings in time and lubricant costs.

**Sun mine car lubricants** have proved their qualities on thousands of jobs. They have no tendency to dry up, harden, or separate. They keep dust and water out of car bearings, keep cars moving easily, keep bearings in A-1 condition.

**For long service**, for minimum maintenance, for maximum production, specify "Job-Proved" Sun lubricants for all your mine machinery. Call in the Sun Engineer near you, today.

*John*

**SUN OIL COMPANY • Philadelphia 3, Pa.**  
Sponsors of the Sunoco News-Voice of the Air - Lowell Thomas

**SUN**  
**SUNOCO**  
**INDUSTRIAL  
PRODUCTS**

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*A development of*  
**B.F. Goodrich**  
**FIRST IN RUBBER**



## 75 million smacks on its rubber face

*A typical example of B. F. Goodrich development in rubber*

THOSE pine logs are on their way to being paper. After the bark is removed, the logs—some 5 feet long and 2 feet across—are dumped onto that moving belt; edgewise, endwise, flat, any way they happen to tumble from the debarking drum. Standing and walking on the belt, workmen sort the logs, throwing out the bad ones, letting the good ones travel on to the pulp grinding room.

Steel conveyors are generally used in mills like this because the crashing logs would tear ordinary rubber and cotton belts to shreds in no time. But steel conveyors slow down the workmen—

and production—and they're expensive to keep in shape. Looking for a better way to handle the logs when this mill was built, the manufacturer heard of a new kind of belt, developed and manufactured by B. F. Goodrich. Called a cord belt, it is made with each separate cord in each ply surrounded by rubber. Then, for good measure, an added ply with the cords running crosswise is placed on top. This permits the belt to stretch both ways and so absorb the crushing blows of logs—or rocks or lumps of coal.

The cord belt in the picture was installed, and in 6 years 75 million logs

have poured onto it from the debarking drum. The belt is still in service and good for more millions of smacks on its rubber face.

The development of products like the cord belt—and thousands of others—by B. F. Goodrich show why your B. F. Goodrich distributor can almost always help you solve any problem involving the use of rubber—natural or synthetic. And if he can't, just write *Industrial Products Division, The B. F. Goodrich Company, Akron, Ohio.*

**B.F. Goodrich**  
RUBBER and SYNTHETIC products

R v.51<sup>2</sup> July-Dec. 1946

# First in its Field ...



## MAN THE BELLOWS, FELLOWS FOR THE FIRST "AIR CONDITIONING"

We don't know whether or not this is the original mine worked by Snow White's Seven Dwarfs... in any event, one of them seems to have had to stay outside constantly to air-condition the tunnel by sheer bicep-power. This muscle-operated, rock-ballasted contraption is the earliest known device of its kind on record, as graphically pictured in Agricola's "De re Metallica" in 1556. Seems to have done the job, too, tho' we have serious doubts that the miners "whistled while they worked."

We do know that the first **QUALITY GREASE** for properly lubricating coal mining equipment was—and continues to be—**HULBURT QUALITY GREASE**. It was the **FIRST** perfected, the **FIRST** to do the job **RIGHT**. And it continues to be **FIRST** in its specialized field because it does its job better than anything else... supplemented by the down-in-the-mine services of **HULBURT LUBRICATION ENGINEERS**. Lubrication trouble is dwarfed when mining machines are "conditioned" with **HULBURT QUALITY GREASE!**

HULBURT OIL & GREASE COMPANY — PHILADELPHIA, PENNA.

*Specialists in Coal Mine Lubrication*

*Teel*

*. a record of*  
*American Leadership*

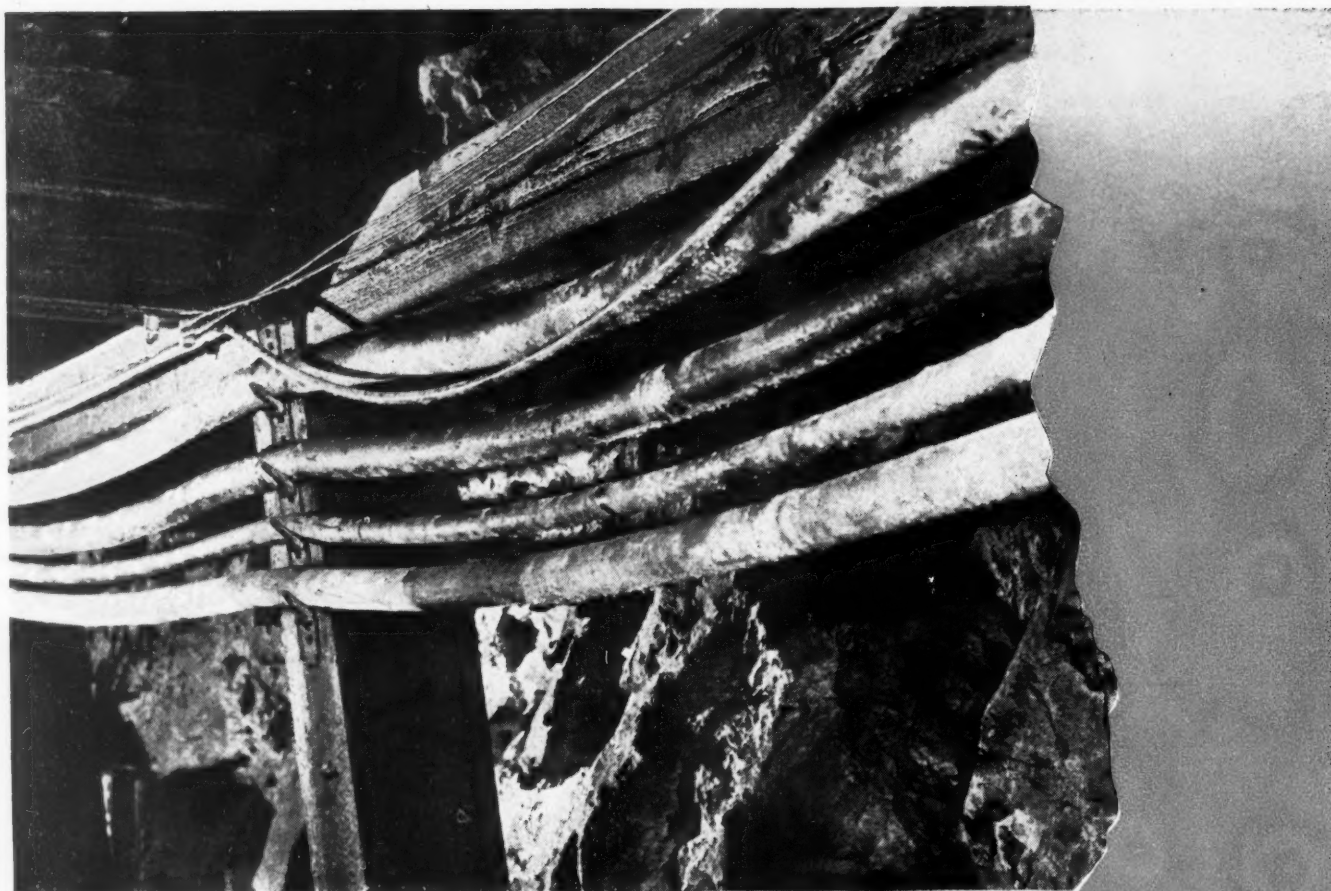


**HULBURT**

*Quality* **GREASE**

THE "FIRST NAME" IN

• HAZARD SPIRALWEAVE MINE POWER CABLES,  
sizes 300,000 CM to 750,000 CM 3 conductors.



Phillipson Tunnel. Photo courtesy of Climax Molybdenum Company, Climax, Colo

# SELECT HAZARD on its record

For about ten years these Hazard Spiralweave power cables have been delivering unfailing service, yet tests would prove that they are still in their "youth". Constant dampness, dripping water, chemical action — all those potential life-shortening agents that cables are exposed to in mines — have made no impression on these "tough boys", even though a part of the time they have been worked under the stress of overloads.

Such dependable service . . . the kind that actually reduces operating costs . . . is typical of what you can count on when you select Hazard insulated wires and cables. Next time

you need insulated wires or cables for any mining use, let Hazard Engineers show you the record. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.



## HAZARD

**insulated wires and cables  
for every mining use**

4643

July, 1946 • COAL AGE

# Coal Age

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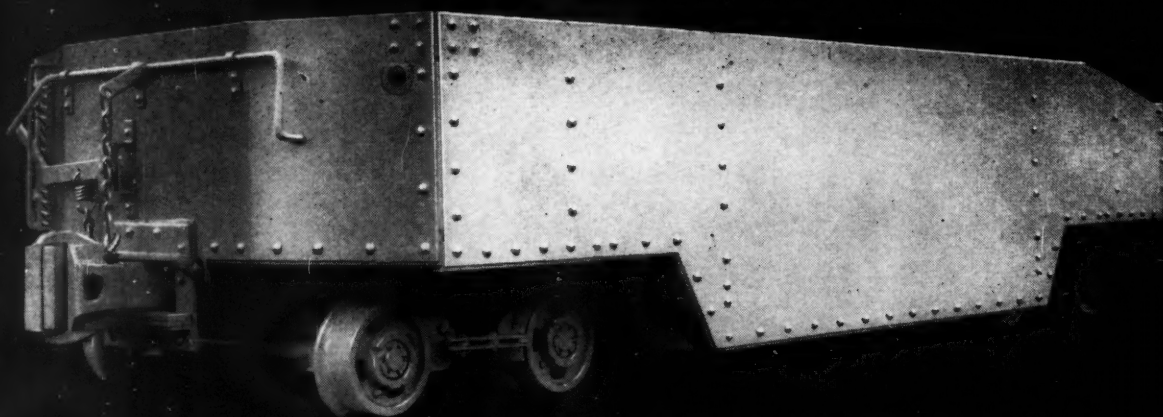
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New Address .....

New Company Connection .....

New Title or Position.....

# A BETHLEHEM ALL-STEEL MINE CAR LASTS FOR YEARS



One of the newest Bethlehem mine cars. It is equipped with automatic self-centering couplers, Mayari R body plates, roller bearing trucks, and brakes that are fully equalizing on either curved or tangent track.

Yes, literally years. Here's an example: some Bethlehem all-steel cars have been on the job in an anthracite mine since the early 1930's. Much of the time, they've seen heavy-duty service; have taken a cruel pounding. Yet only now are they showing the need for a major overhauling.

Steel cars live the longest. This is especially true when they're Bethlehem-built, for Bethlehem is an old hand at the game—both at making the steel and building the cars.

No matter what type you want . . . whether end dump or rotary dump, high- or low-side cars . . . Bethlehem can make them for you. They will come equipped as you specify. And they'll be cars that won't require large maintenance crews or shop facilities.

Bethlehem mine cars *last*. This has been amply proved in both anthracite and bituminous service. Ask our engineers for full details.



**RUN YOUR  
FINE COAL**

Through  
This  
**B  
I  
R  
D**

**and  
what  
happens**

— it comes out dry and whole, just right for blending with the larger sizes. The BIRD takes it just as it comes from the washers, dries it, returns the water so clean it's ready for re-use.

The Bird Centrifugal Filter makes an ideal team with any cleaning system. It runs continuously for months without parts replacements or overhaul. It gives you an opportunity for operating improvements and savings that you cannot afford to overlook.

Let us tell you all about this machine and what it can do for you. Write Bird Machine Company, South Walpole, Massachusetts.

**THE BIRD**

**CONTINUOUS  
CENTRIFUGAL FILTER**

# Formula for Big Tonnage:

**The RIGHT Equipment +  
Equipment TEAMWORK  
= VOLUME OUTPUT!**

**I**T ALL ADDS UP TO *modern* mechanization. It means keeping tonnage up and keeping costs down. It means better utilization of manpower and machinery . . . better methods of making units of equipment work together well.

#### **Dependable Recommendations**

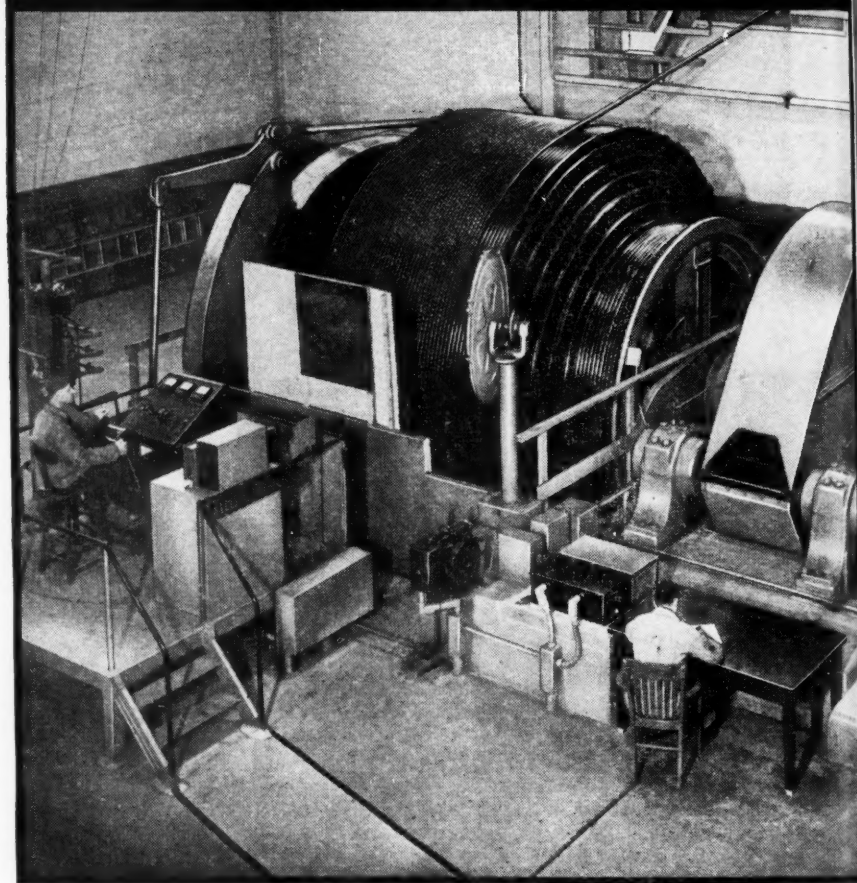
Allis-Chalmers has both an unusually wide range of coal equipment *and* a vast backlog of experience to draw on when recommending efficiency-improving methods and cost-lowering equipment for the coal industry.

#### **Iron Out Production Problems**

Allis-Chalmers engineers are specialists in analyzing, not a part, but the whole of the production process . . . and in teaming up new and existing equipment for top performance. Yes, Allis-Chalmers can help you get *volume tonnage at lower cost!*  
ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2064

## **Mine Hoists**



**HOISTING HP CAN BE CUT** with modern, all-electric hoists and controls. Safe, husky Allis-Chalmers mine hoists operate smoothly at peak loads, rate tops in performance. Accurate, automatic "Regulex" speed control eliminates uneven, jerky stops that strain nerves and equipment. Allis-Chalmers is the *only* manufacturer that builds hoists plus all auxiliary equipment to drive them — your assurance of best unit responsibility. For shaft, skip, or slope installations . . . for new, closer-to-workings shafts — Allis-Chalmers builds single and double drum hoists in sizes up to 8000 lb rope pull.

# **ALLIS CHALMERS**

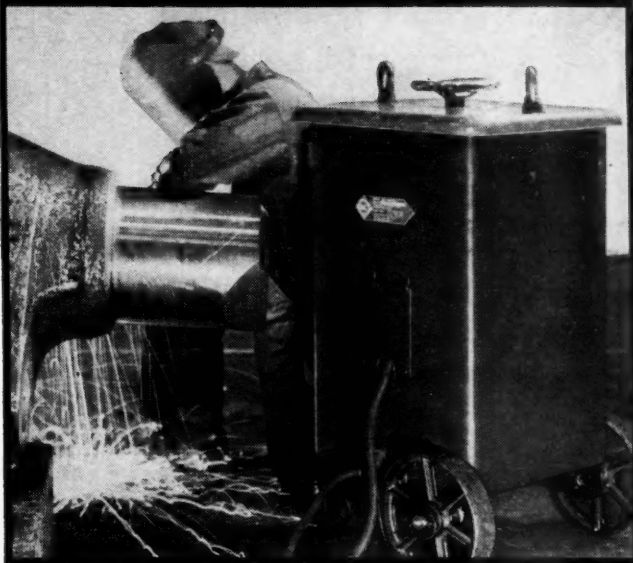
**One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products**

## Centrifugal Pumps



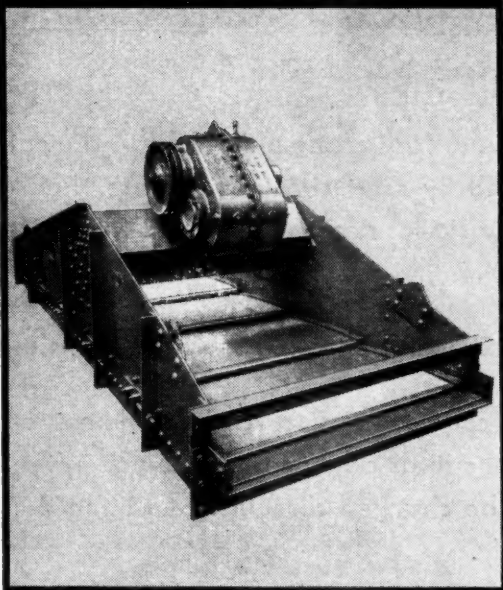
**TOUGHEST PUMP OF ITS KIND** is new A-C "Solids-Handling" pump that outlasts ordinary pumps *2 to 4 times!* New abrasive-resistant alloys multiply life of parts, give you longer continuous operation. New, simplified design means fewer working parts and quick accessibility to those parts — fast assembly, negligible down time. Low in initial cost and power requirement. Handles up to 40% solids. 175 to 7000 gpm; heads to 100 ft. **Bulletin B6381.**

## Auxiliary Equipment



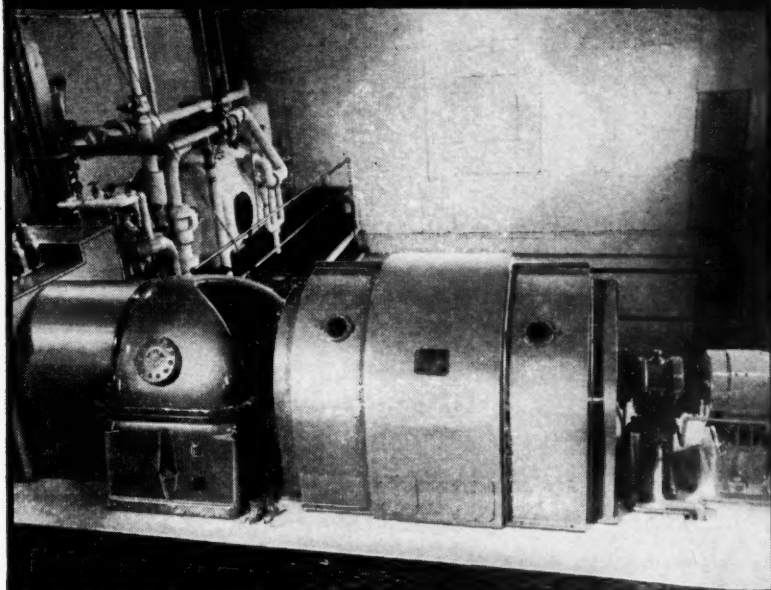
**FOR QUICK, CLEAN, ECONOMICAL WELDING** this Ampac 400 welder with magic arc control is mighty handy. There's no weaving flame at high current settings with Ampac! And it arcs readily at high or low current. Power consumption? Ampac *cuts power bills!* A reactor coil utilizes flux in air gaps, puts flux energy back to work. Automatic voltage for every setting. Maintenance negligible. Four sizes: 200, 400, 750, and 1000 amps. **Bulletins B6306 and B6302.**

## Basic Processing



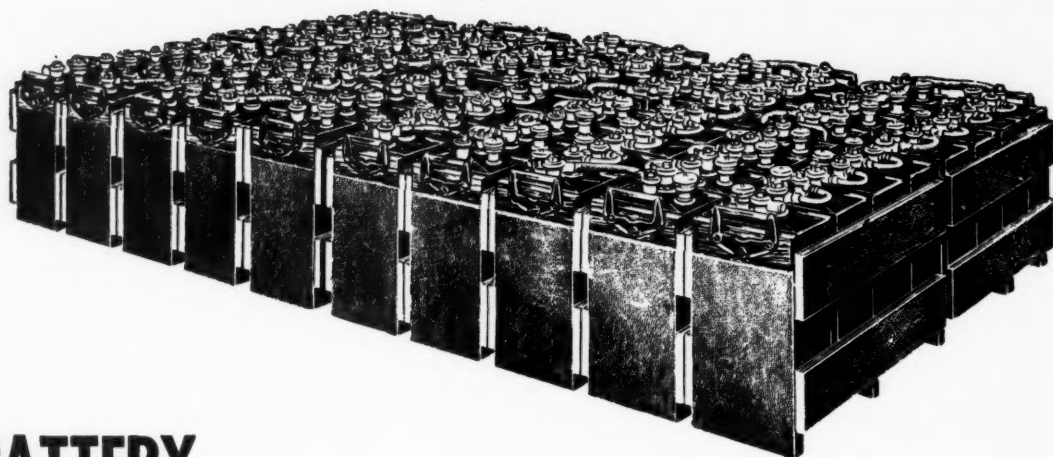
**HIGHLY EFFICIENT FOR COAL DEWATERING** and sink-float operations, the Allis-Chalmers Low-Head Vibrating Screen equipped with end-tensioned deck offers the kind of modernization that cuts coal processing costs. It offers, also, substantial savings in installation and remodeling costs because it operates *horizontally* . . . requires less headroom and space. Moderate to heavy duty use. Sizes from 3x6 to 6x6 ft. **Bulletin B6330.**

## Power Generation



**ECONOMICAL, TROUBLE-FREE POWER** for coal mining and coal preparation is supplied by a wide range of Allis-Chalmers industrial steam turbines. Shown above is a 3000 kw, 3600 rpm condensing, impulse-reaction type turbine and alternator unit. Allis-Chalmers advanced, *functional* turbine design means more effective performance on the job . . . greatly reduces problems of operation and maintenance. Generators are provided with self-contained cooling systems that provide a liberal quantity of clean, cool air at all times . . . eliminate shut-down for generator cleaning. **Bulletin B6316.**

# ...builds for COAL



## USE the Haulage BATTERY with these Cost-Cutting Advantages



These inherent construction and operating advantages are principal reasons why Edison Alkaline Batteries provide the closest approach to failure-free uninterrupted haulage power it is possible to obtain; give longer service life than other types of batteries; are so simple to maintain, and consequently, so economical to use. Because of their unequaled dependability and long, trouble-free life, alkaline batteries are helping users to keep down haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J.*

*In Mine Locomotives and Shuttle Cars, Only Edison Alkaline Batteries Give You These Important Advantages:*

- They are **durable mechanically**; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are **foolproof electrically**; are not injured by short circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They are **simple and easy to maintain**.
- They can be **charged rapidly**; do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes**; are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury, without attention, and without expense.

# Edison

ALKALINE BATTERIES

# ROCK WORK IS TOUGH

IT takes a bruiser to beat a bruising job. That's why Goodyear Hard Rock Lug tires are *first choice* wherever rock work's toughest. For these thick-tread haulers are brutes for punishment—built extra tough to take the murderous beating of every type of rock work. And years of standout service keep proving that these great Goodyears stand up longer, take it better, consistently deliver more pay loads at rock bottom costs. That's why it will pay to equip *your* rock-work units with Hard Rock Lugs—which today, for all practical purposes, are the equal of prewar tires in natural rubber content!

**—but this brute is tougher!**

*—and here are the reasons why:*

**MASSIVE LUG BARS** armor the tread and sidewalls against cutting

**SELF-CLEANING TREAD** doesn't pack up, bites deeper, pulls better

**EXTRA-THICK UNDERTREAD** lengthens tire life—protects carcass from bruises

**SUPERSTRONG CARCASS** of Goodyear's patented Rayotwist Cord—made from rayon—adds more stamina, long life

**MULTIPLE BEADS** of high-tensile steel wire insure non-slip anchorage to rim

**BUY and SPECIFY  
GOODYEAR  
—it pays!**

Rayotwist—T.M. The Goodyear Tire & Rubber Company

# GOOD YEAR

**MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND**

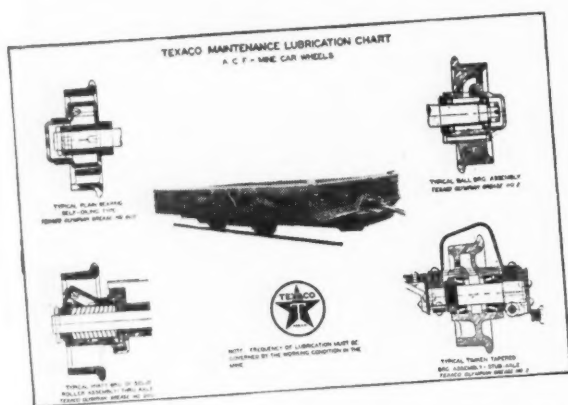
# GIVE WHEELS LONGER

MINE car wheels require less frequent lubrication with *Texaco Olympian Grease* because *Olympian protection lasts longer!* This outstanding lubricant is made to resist separation and leakage . . . to maintain protection under severe conditions of cold and heat, dirt and mois-

ture . . . to keep frictional drag at a minimum, assuring easier starts and enabling you to haul more cars per trip.

*Olympian Grease* is a compound of carefully refined mineral oil and a water-insoluble base, developed especially for the lubrication of mine equipment. Use it to assure effective lubrication of anti-friction as well as cavity hub and plain bearings . . . and for loaders, cutters and similar equipment. You will find it exceptionally easy to apply.

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, National Sales Division, Dept. C, 135 E. 42nd St., New York 17, N. Y.



FREE! Texaco Maintenance Lubrication Charts are prepared in cooperation with leading manufacturers of underground mining machinery. They approve Texaco products for use on cutters, loaders, locomotives, etc. Charts show clearly where and when to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.

TUNE IN THE  
TEXACO STAR THEATRE  
EVERY SUNDAY NIGHT  
WITH JAMES MELTON  
— CBS



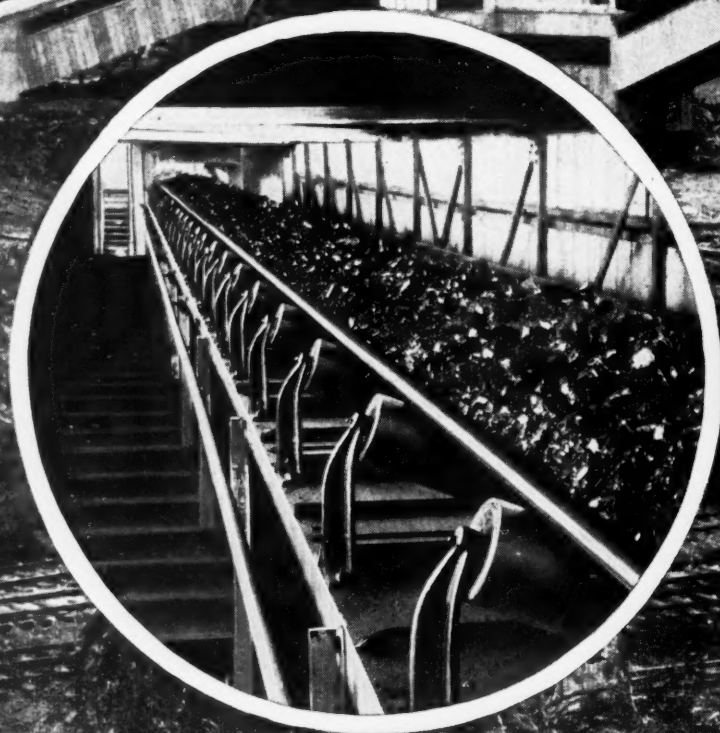
## TEXACO LUBRICANTS

# **-LASTING PROTECTION**

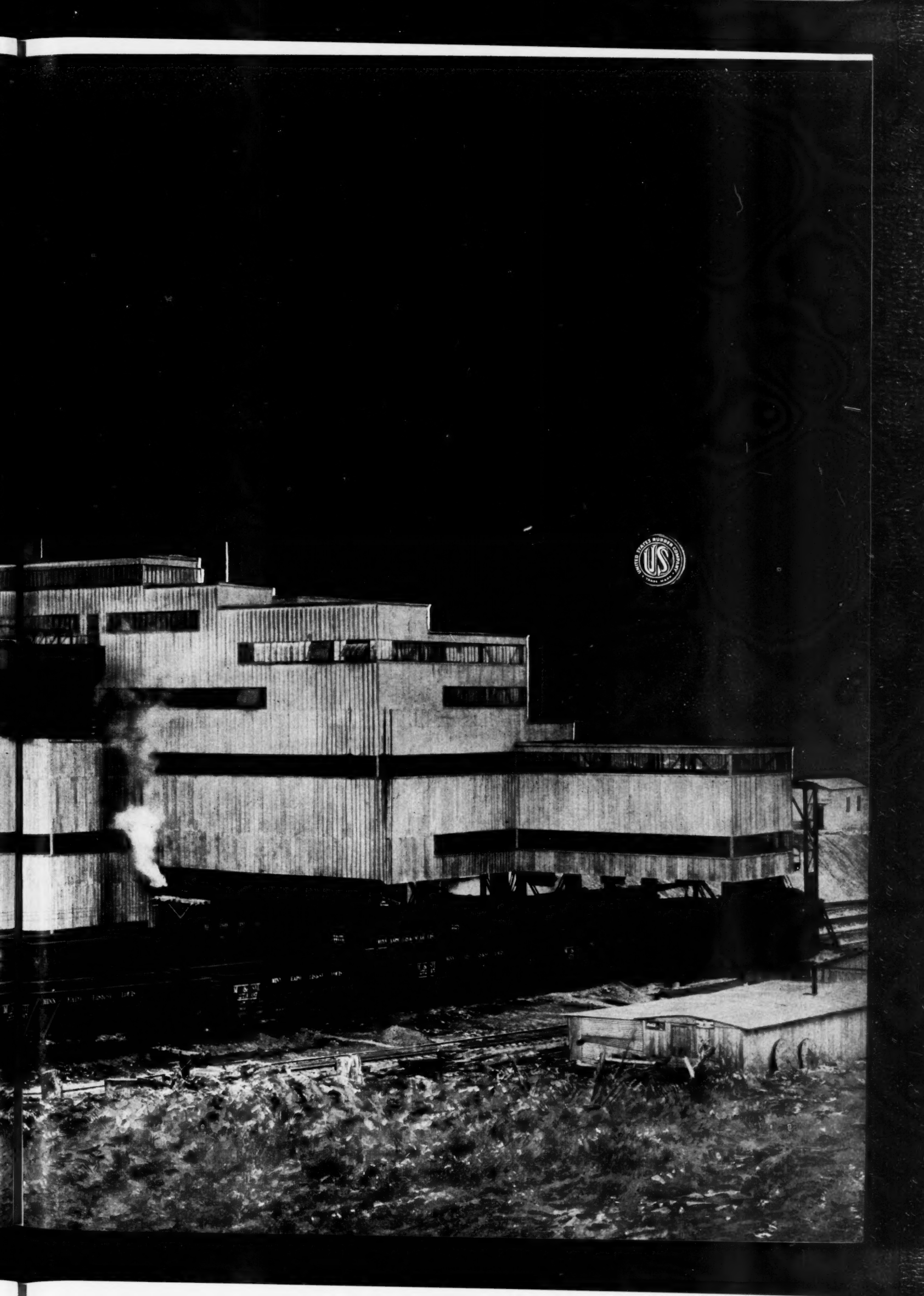


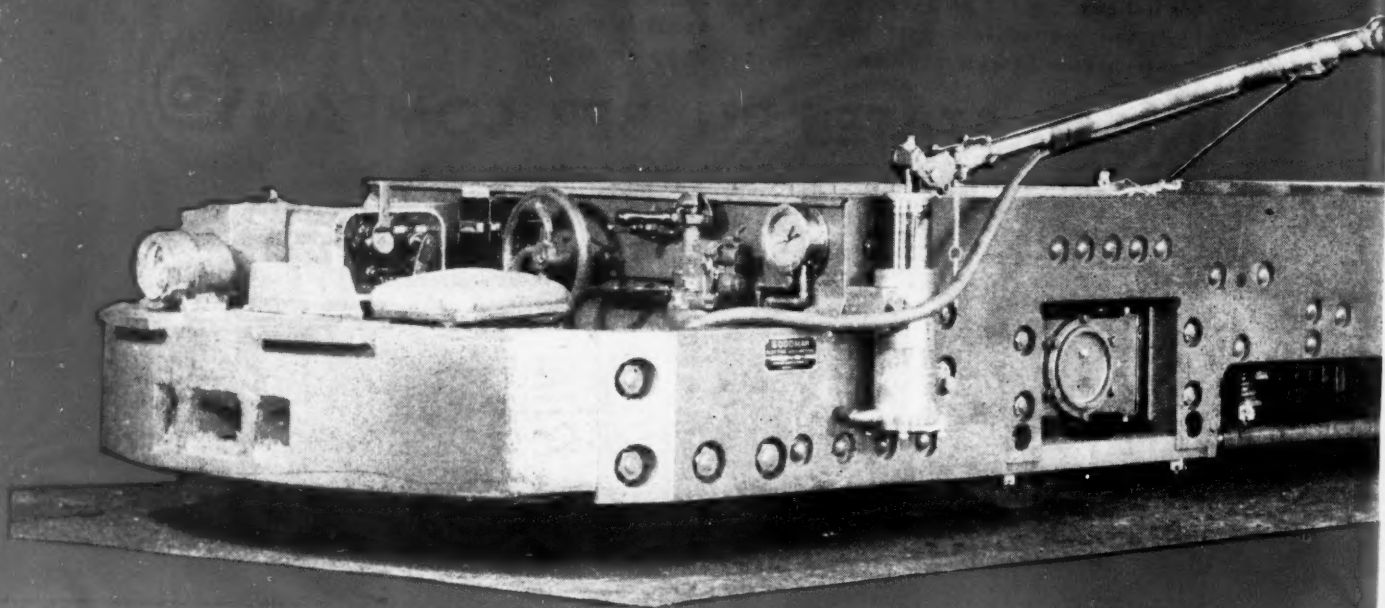
## **For the Coal Mining Industry**

# COORDINATED ENGINEERING *Gets Results!*

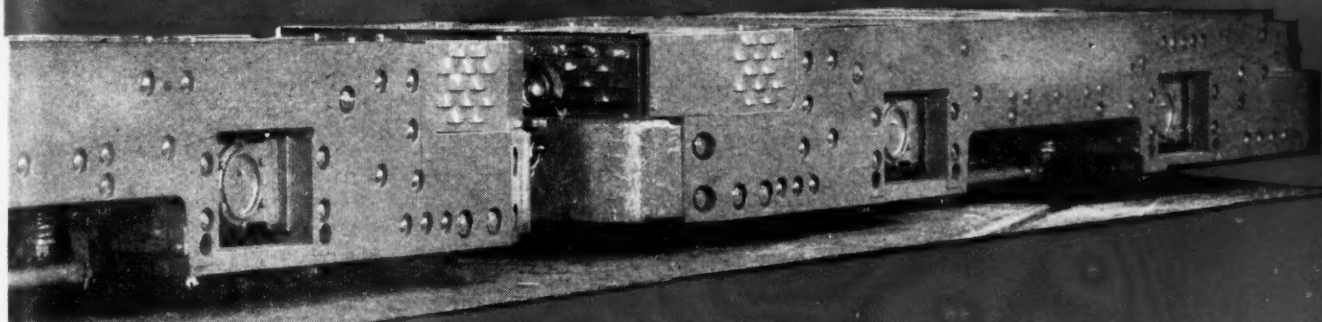


This is one of many efficient coal preparation plants developed through Coordinated Engineering. Mine Engineers and Equipment Engineers worked together with U. S. Rubber Belt Engineers in designing the conveyors. Coal volume is high and steady, production costs are low.





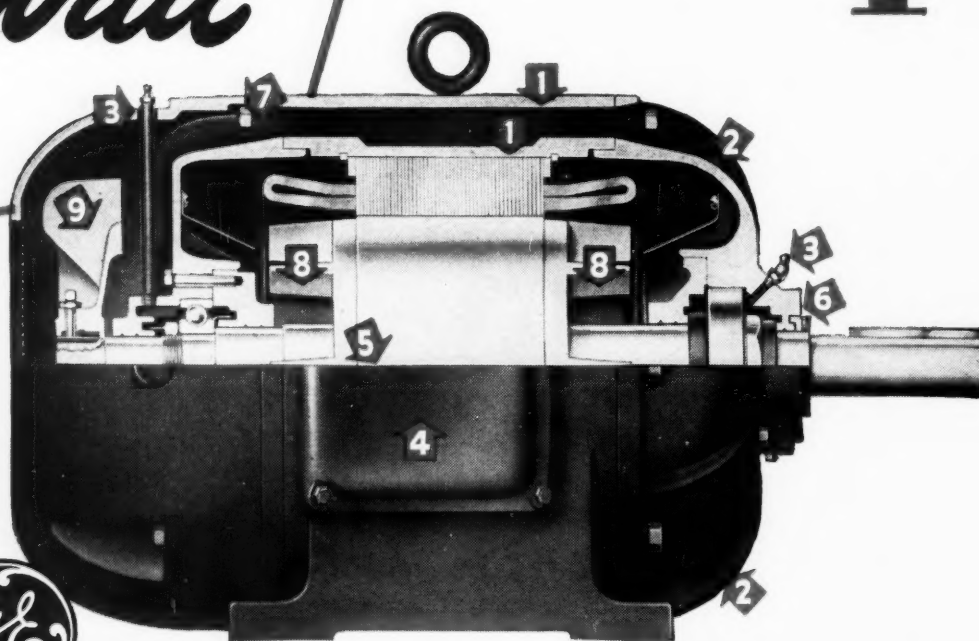
**GOODMAN**



# TANDEM LOCOMOTIVES

**A  
Double  
Wall**

**Keeps**



**TRI/CLAD**

**TOTALLY ENCLOSED  
STANDARD  
and  
EXPLOSION-PROOF  
MOTORS**

FOR THE COMPLETE STORY

Apparatus Department  
General Electric Company  
Schenectady 5, N. Y.

Please send me GEA-4400, which describes the new Tri-Clad totally enclosed motor.

Please send me GEA-4131, "Motors and Control for Hazardous Locations."

Name .....

Company .....

Address .....

750-257-8030

These 9 points of new strength and serviceability put this **TRI/CLAD** totally enclosed motor way ahead.

1. A cast-iron, double-wall frame that completely encloses windings and punchings
  2. Ribbed, cast-iron end shields, machined to provide a tight seal, yet easily removed
  3. Well-proved, pressure-relief greasing system which can be packed with a long-life lubricant where advisable
  4. Cast-iron conduit box diagonally split for wiring convenience (independently explosion-proof on explosion-proof motors)
  5. Leads are sealed in a nonshrinking compound at the point where they emerge from the frame
  6. Rotating labyrinth seal prevents infiltration of grit or liquids
  7. Large, free-flowing, easy-to-clean air passages protect parts from accumulation of dust and foreign material
  8. Modern "ageless" insulation treatment includes Formex\* magnet wire
  9. Powerful external fan is removable, simplifying maintenance (nonsparking type for explosion-proof motors)
- AND IN ADDITION**—compactness and short length promote ease of handling and installation

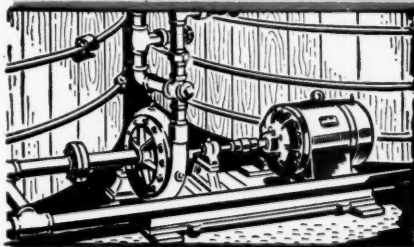
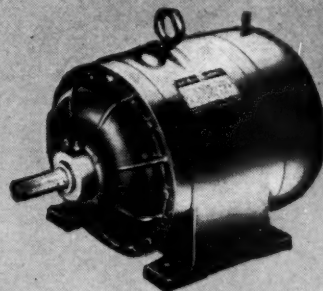
\*Trade-mark reg. U.S. Pat. Off.

**GENERAL  ELECTRIC**

# Trouble Out

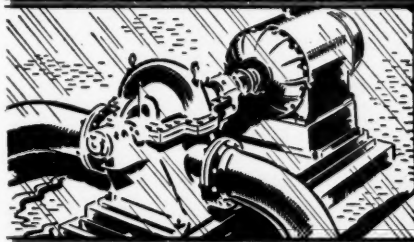
**NEW *TRI-CLAD* TOTALLY ENCLOSED MOTOR IS MORE FULLY PROTECTED FROM DUST, DIRT, WEATHER, OR WHAT HAVE YOU...**

Now, General Electric has applied Tri-Clad construction to its line of totally enclosed induction motors (1 to 1000 hp) and to most of its explosion-proof motors as well. *Extra protection* has been raised another notch.



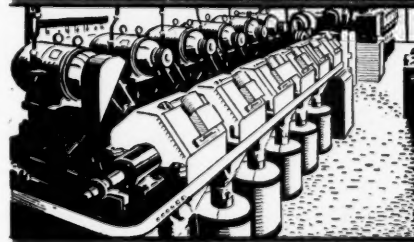
## FOR EXTRA-SEVERE JOBS

Applications amid dust, metal filings, coolants, or corrosive agents—where totally enclosed motors have always been required—will now have the benefit of a stronger armor, plus convenience features that simplify installation and servicing.



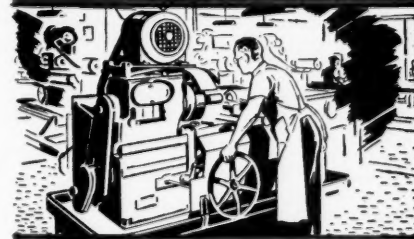
## FOR EXTRA-WET LOCATIONS

Indoors or out, these Tri-Clad totally enclosed motors will take hoses or heavy rains without danger of shutdown. The cast-iron frame is strongly resistant to rust and corrosion.



## FOR HAZARDOUS ATMOSPHERES

"Companion motors" to the standard Tri-Clad totally enclosed, the new explosion-proof and dust-explosion-proof types are tested and listed by Underwriters' Laboratories for Class I, Groups C and D, and Class II, Groups E, F, and G.

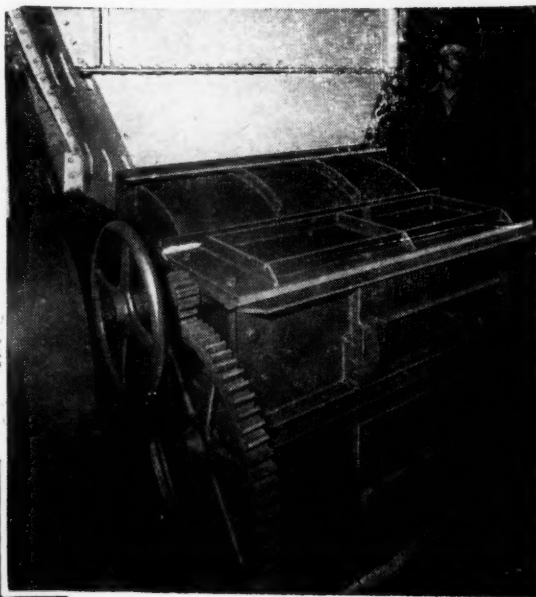


## FOR EXTRA-LONG LIFE

Many motor users are making the totally enclosed motor their standard for all jobs—based on evidence of long-term savings. This new member of the Tri-Clad line makes this decision more logical than ever.

*Nothing makes up  
for lost tonnage  
except* **EFFICIENCY!**

*Get your tonnage up  
with* **AMERICAN  
Rolling Ring  
CRUSHERS**

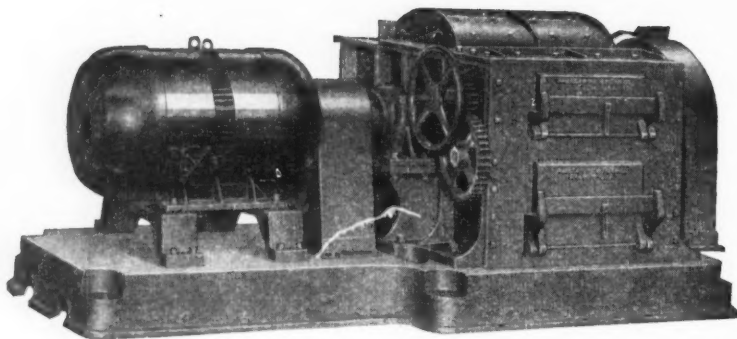


In your efforts to close the gap between your delayed output and your present production requirements, consider the many advantages that American have to offer.

Only increased efficiency can help you "catch up" on delayed production schedules, and this efficiency is portrayed in the AMERICAN Rolling Ring CRUSHER. Americans are dependable crushers that reduce in one operation, ROM or lump coal to uniform stoker or pulverizer size, at less than 1¢ per ton.

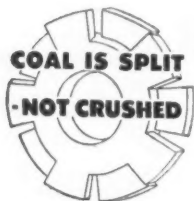
Simplicity of operation . . . easy adjustability . . . low cost operation . . . high capacities . . . endurance to withstand severe usage under all kinds of conditions . . . Americans measure up to all of these conditions.

Costly, time-wasting breakdowns are practically eliminated. The deflection of shredder rings upon contact with tramp metal protects the Crusher against damage. Housings are heavy castings, rib-reinforced to withstand greatest crushing strains — Rings, Breaker plate, grinding plate and grate bars are of manganese steel. Capacities up to 500 TPH.

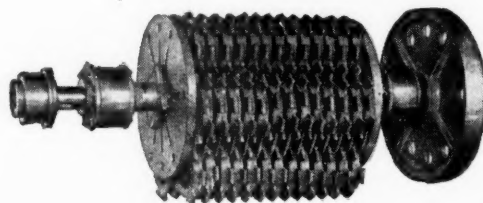


One of the many features of the American Rolling Ring "AC" Crusher, is its many shredder rings with multiple cutting edges. They develop their tremendous splitting impact through rotating with powerful centrifugal force at right angles to the rotor mainshaft. Through this slow speed, rapid-impact shredder ring method coal is split instead of crushed to uniform stoker or pulverizer sizes.

Used effectively and economically in many mines all over the country—Americans are proved a dependable crushing unit, custom-built to fit your specific job requirements.



Patented Manganese Shredder Rings, each with 20 cutting edges, are found only in Americans. They split instead of crush coal, thereby, minimizing fines and preventing clogging. In contact with tramp metal, the rings are deflected to prevent any damage to them, and thus eliminating the need for shear pins and other conventional safety devices.



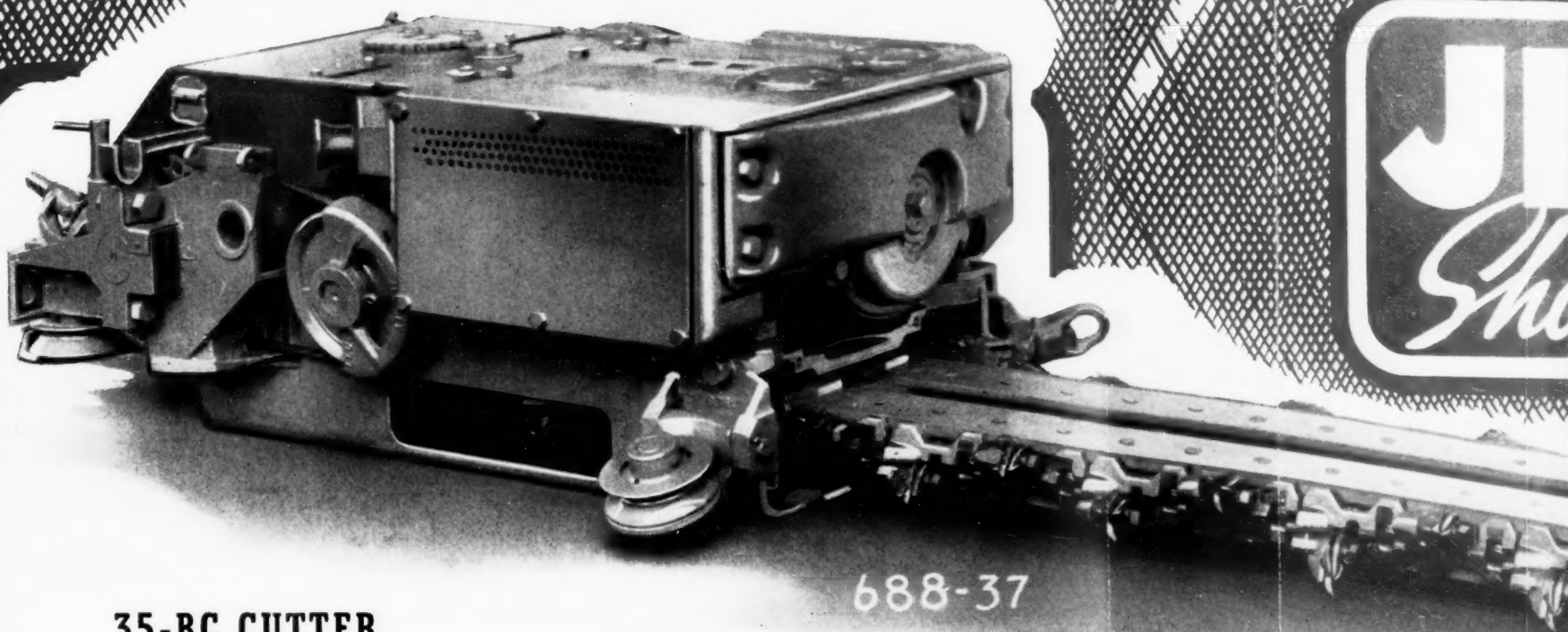
Send for illustrated bulletin "Crushing Coal At Less Than One Cent a Ton"

**American**

**PULVERIZER COMPANY**

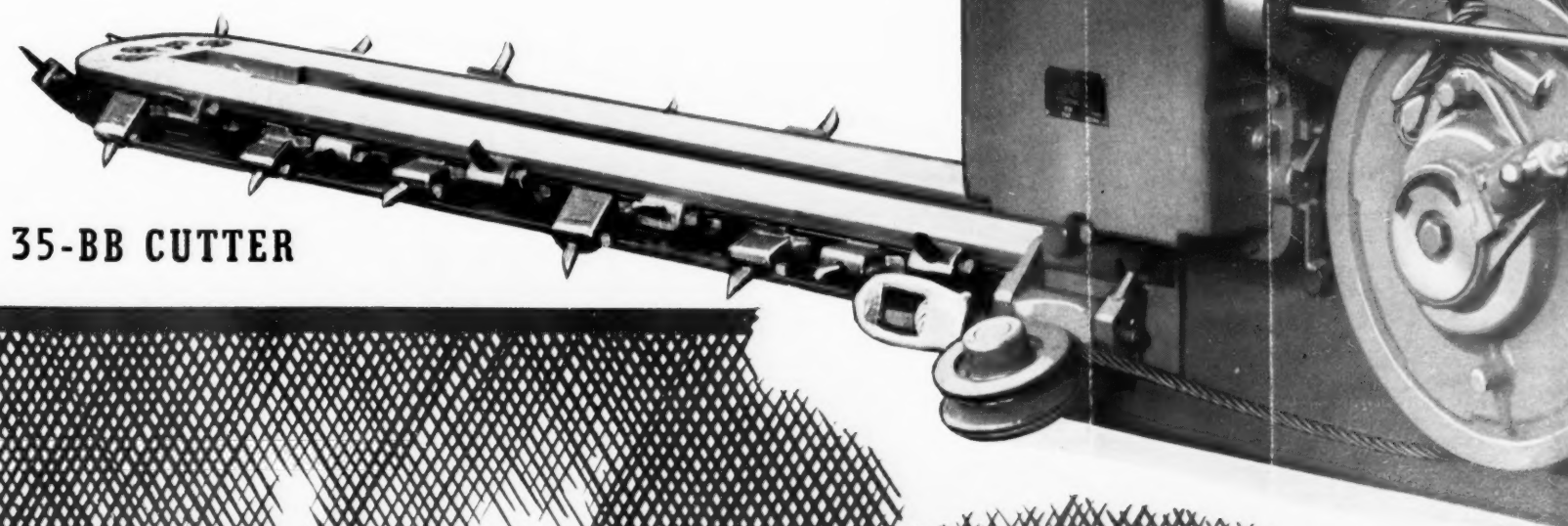
*Originators and Manufacturers of  
Ring Crushers and Pulverizers*

1119 Macklind Avenue  
St. Louis 10, Mo.



### 35-BC CUTTER

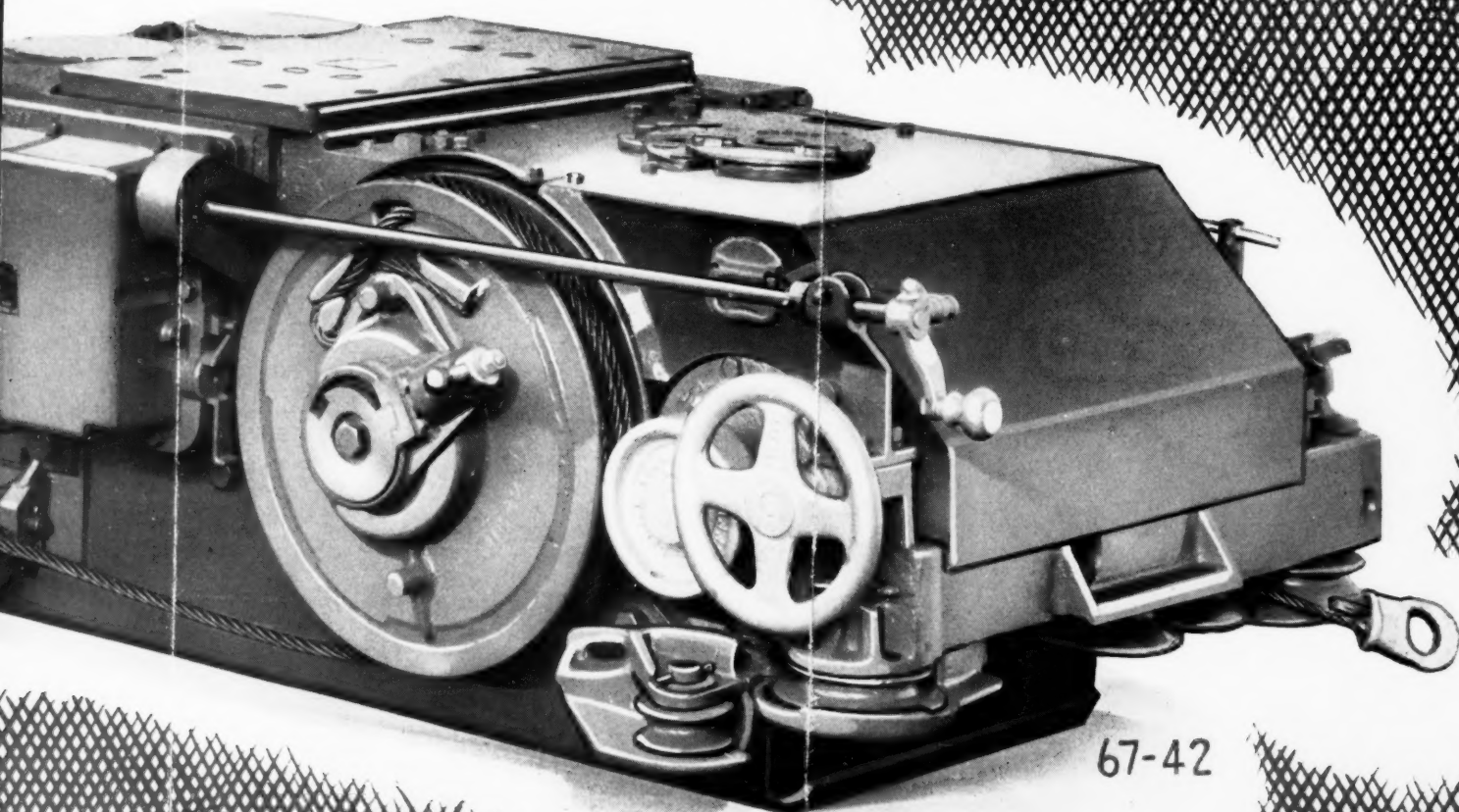
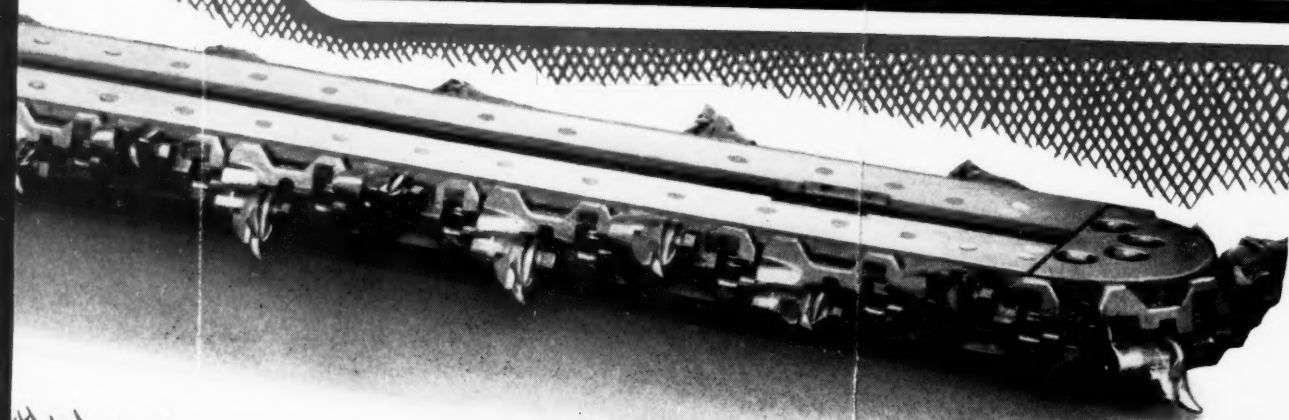
● These machines are of heavy, rugged construction for continuous underground duty. The independent operation of the feed and handling mechanism makes control flexible, permitting the machine to be sumped and the cut started across the face with one setting of the jacks. Jeffrey Shortwall Coal Cutters are designed to meet every requirement of shortwall mining. They are available for either A.C. or D.C. operation and as open or Government approved equipment.



### 35-BB CUTTER

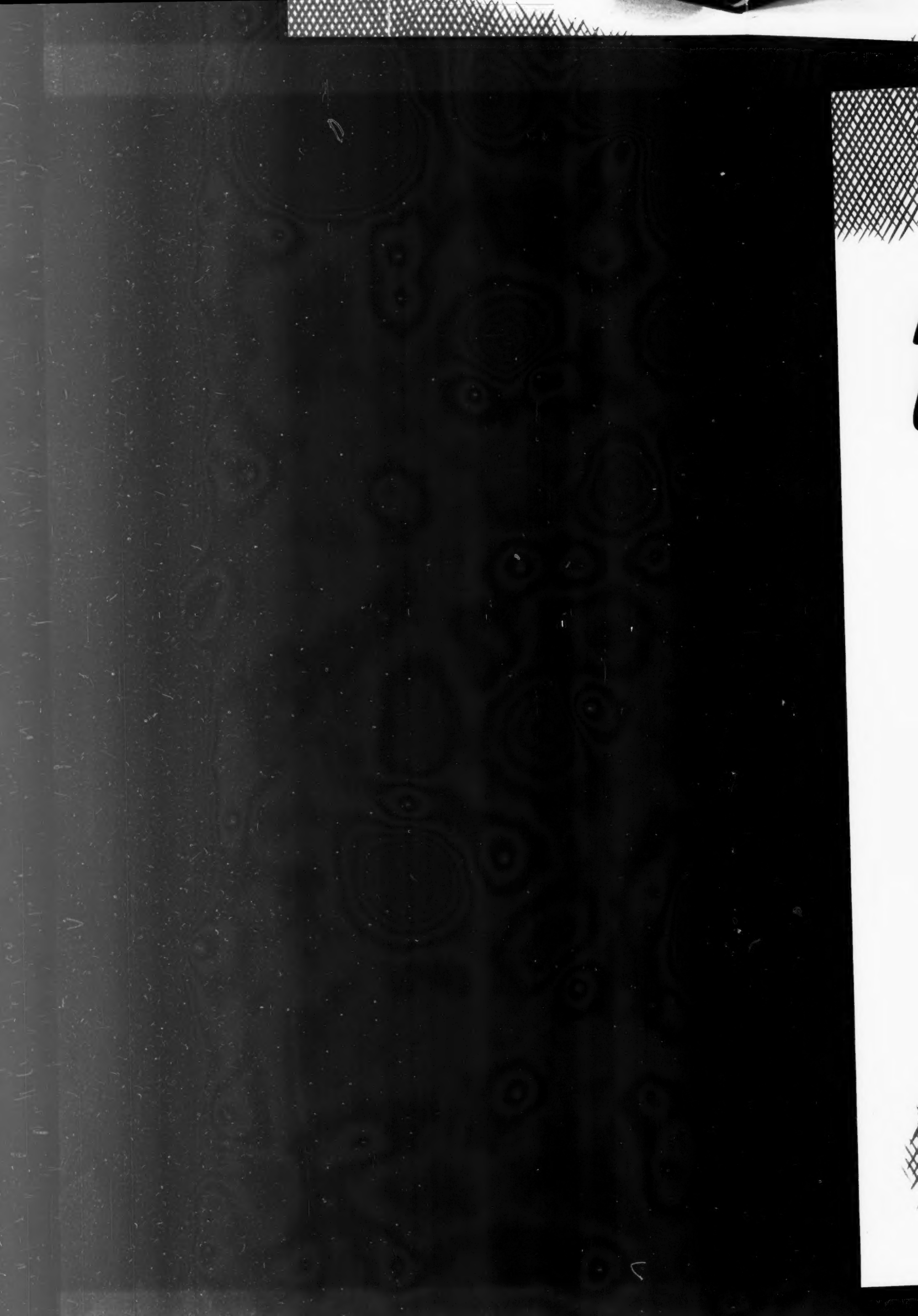
# JEFFREY

*Shortwall* **CUTTERS**



67-42





# DID YOU

That Vitamin "K" and certain other chemicals recently suggested as a preventive agency against dental caries are derived from coal.

# KNOW?

That Jeffrey Shortwall Coal Cutters have fewer gears . . . bigger gears. Hence they wear longer, resist breakage, have lower maintenance and require less power.



T

Sal

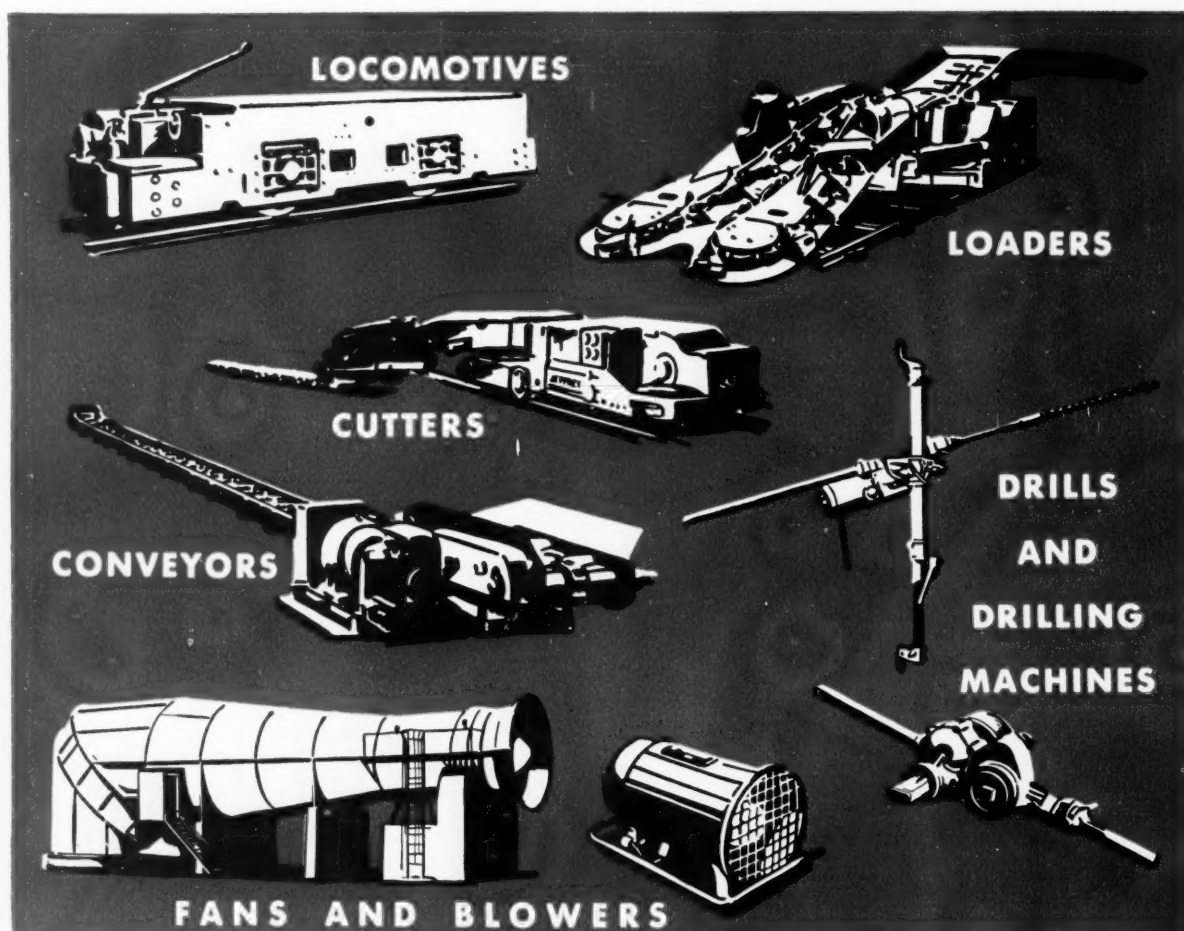
Se

For

# Jeffrey

## EQUIPMENT FOR COAL MINES

JEFFREY SERVICE TO THE COAL MINES  
MEANS SERVICE TO ALL INDUSTRY



## THE JEFFREY MANUFACTURING COMPANY

*Established in 1877*

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

**Sales Offices:**

Baltimore  
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Jeffrey Mfg. Co., Ltd.  
Montreal, Quebec

British Jeffrey-Diamond, Ltd.  
Wakefield, England

Jeffrey-Galion (Pty), Ltd.  
Johannesburg, S. A.

# COMPARE SOLIDS PUMPS!

HERE ARE FEATURES YOU WANT ...		HERE'S WHY YOU WANT THEM ...	NOW COMPARE PUMPS!				
			A-C SOLIDS PUMP	SOLIDS PUMP A	SOLIDS PUMP B	SOLIDS PUMP C	SOLIDS PUMP D
1	Special abrasion-resistant alloy construction.	Longer pump life. With new A-C pump, users report 2 to 4 times longer pump life!	YES	NO	YES	YES	YES
2	Remove entire rotating element without disturbing the piping.	Simpler maintenance, less downtime. New A-C pump can be knocked-down and reassembled in 1/2 hour.	YES	NO	YES	NO	NO
3	All working parts quickly and easily accessible.	Cuts downtime. Enables less experienced workers to make repairs. New A-C pump slashes downtime up to 400%!	YES	NO	YES	NO	YES
4	Change capacity quickly without touching pump or parts.	Minimum loss of time. Change capacities on new A-C pump by simply changing Texrope V-Belt drive or drive and motor.	YES	NO	YES	YES	YES
5	Fewest total working parts to wear out.	Reduces repair costs, parts stock. Users of new A-C pump report parts inventory savings up to 70%!	YES	NO	NO	NO	NO
6	Parts must be interchangeable with in different size pumps.	Reduces parts inventory. In A-C pump, 1 bearing, bracket and shaft assembly fits 3 pump sizes.	YES	NO	YES	YES	YES
7	Complete flexibility of piping discharge.	Discharge in any direction without complicated piping arrangements. A-C pump allows 5 discharge angles, 45° apart.	YES	NO	NO	YES	NO
8	Widest capacity range within fewest pump sizes.	Fewer pump sizes needed, lower costs. In A-C pump, 3 bearing bracket sizes fit casings ranging from 100 gpm to 7000 gpm.	YES	NO	NO	NO	NO
9	Lowest possible initial cost.	Save money. New A-C pump is priced competitively low—will pay for itself in operational savings.	NO	YES	NO	NO	NO
10	A pump designed to solve coal industry problems — not a substitute "general" type pump.	No wasted efficiency. A-C pump is result of many months of close engineering cooperation between A-C and coal operators.	YES	NO	NO	NO	NO

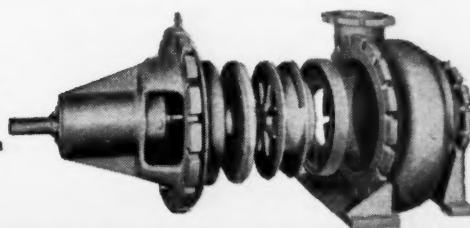
A-C GIVES YOU UP TO  
**400% More Pump Life!**

Eight sizes — capacities from 100 gpm to 7000 gpm.

A 2019

**9 1 5 4 4**  
**PARTS INVENTORY CUT 70%**

**N**EW SIMPLE DESIGN with fewer working parts to wear out cuts parts inventory to 70%, downtime as much as 4 times! Built in close cooperation with coal engineers, this new solids pump increases efficiency sufficient to pay its own way. Abrasion-resistant alloy insures up to 400% longer pump life. Contact your nearby A-C office or write for B6381, ALLIS-CHALMERS, MILWAUKEE.



**ALLIS  CHALMERS**

**SOLIDS-HANDLING PUMPS**

**WE'RE  
10 YEARS OLD!**



**READY TO SERVE YOU BETTER**

**PRODUCTS OF  
ROME CABLE CORPORATION**

**Hot Rolled Copper Rods**

**Bare and Tinned Wires and Cables**

Solid and Stranded  
Round, Square, and Rectangular

**Weatherproof Wire and Cable**

**Magnet Wire**

Cotton, Paper, Asbestos,  
Glass Covered

**Building Wires and Cables**

Rubber and Braided  
Rubber and Lead Covered  
\*SYNTHINOL Thermoplastic Insulated  
\*RoCaFlex Non-metallic Sheathed

**Flexible Cords**

Rubber Insulated  
\*SYNTHINOL Thermoplastic Insulated

**Radio and Instrument Wire**

Rubber Insulated  
\*SYNTHINOL Thermoplastic Insulated

**Heavy Duty Cords**

Rome "60" Rubber Jacketed  
Rome "60" Neoprene Jacketed  
\*SYNTHINOL Thermoplastic Insulated

**Heavy Duty Portable Cables**

Rome "60" Neoprene Jacketed  
Mining, Welding, Power (Type W)

**Power and Control Cables**

Neoprene Jacketed  
Rubber Insulated and Lead Covered  
\*SYNTHINOL Thermoplastic Insulated

**Service Drop and**

**Service Entrance Cables**

\*Trademark

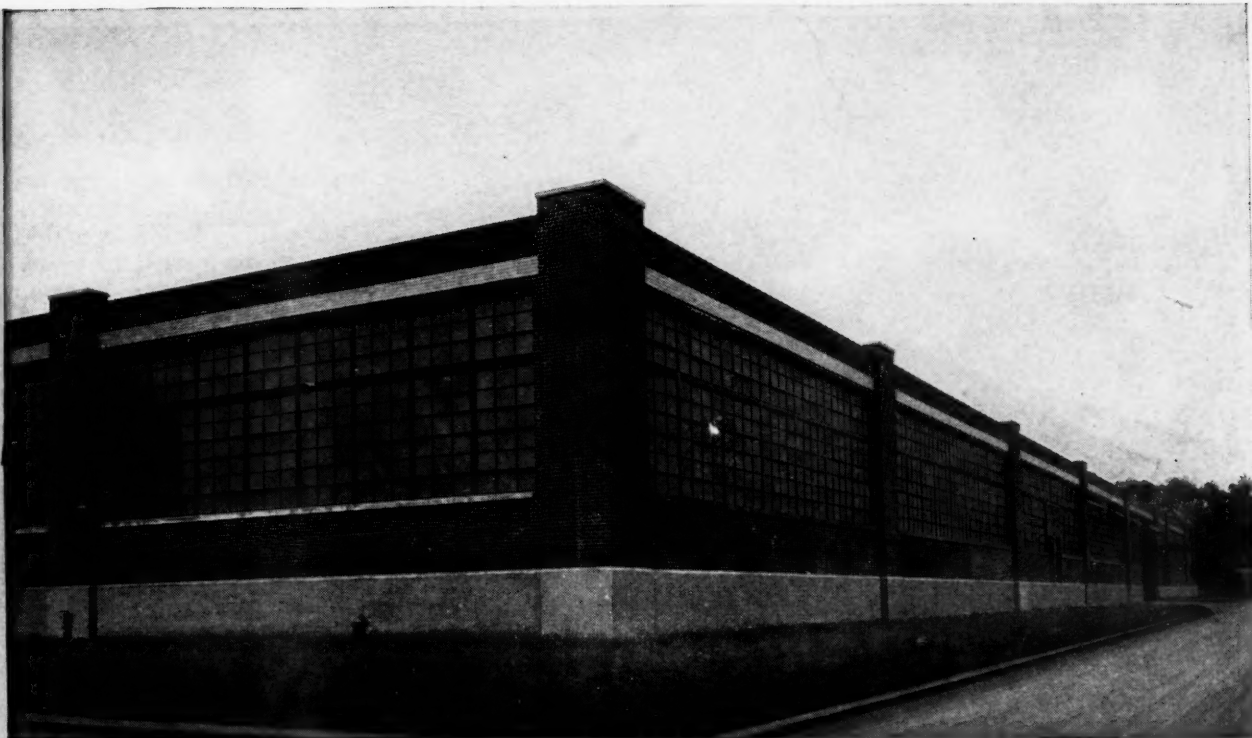
Ten years old this July . . . . .

Since July 15, 1936 when our first shipment was made, we have produced many millions of pounds of copper wires and cables and billions of feet of insulated wires and cables.

For a decade, in War and Peace, Rome Cable has devoted the accumulated "know-how" of its experienced organization to the development and the manufacture of an ever-broadening line of wires and cables to better serve you . . . our customer.

This tenth anniversary finds us working as hard as ever to serve further the electrical industry with diversity of product, honesty of workmanship, and a continued high standard of quality.

You can buy Rome Cable products with complete confidence.



## WITH A NEW PLANT ADDITION

Long hours of planning have gone into the modernization of all our plant facilities and installation of our rubber covered wire department in a new building pictured above. Dedicated to the production of better wires and cables, these improvements will benefit you . . . with new products and increased production.

In our constant search for new and better materials with which to make more durable products, a larger and better equipped laboratory was a vital part in the development of our plans. Since its start, Rome Cable has been proud of its research and product quality control. Our engineering and laboratory staffs welcome your cable problems.

As Romey would say, "It's all part of our desire to serve you with more and better wire and cable products."

FROM BAR TO FINISHED WIRE

**ROME CABLE**  
**CORPORATION**  
 ROME • NEW YORK





Planned maintenance and careful attention to lubrication have paid big dividends to this mine over a period of years. The Gulf Service Engineer in the picture (left) is checking the lubrication of a conveyor.

**Proper lubrication smooths  
the way to greater tonnage,  
lower maintenance costs—**

## it pays to have a Gulf Service Engineer "in the picture"

**F**OR effective help in producing maximum tonnage, take a tip from scores of leading mines that report definitely improved lubrication when the Gulf Service Engineer is "in the picture."

With a background of thorough training and broad practical experience, Gulf Lubrication Engineers are specialists in scientific coal mine lubrication. They co-operate closely with mine oper-

ating and maintenance men to reduce wear, keep equipment on the job, improve safety, increase production, and cut maintenance and power costs.

Make sure you are getting the advantages of all recent developments in lubricants and application methods. Write, wire, or phone your nearest Gulf office today and ask a Gulf Lubrication Service Engineer to call.

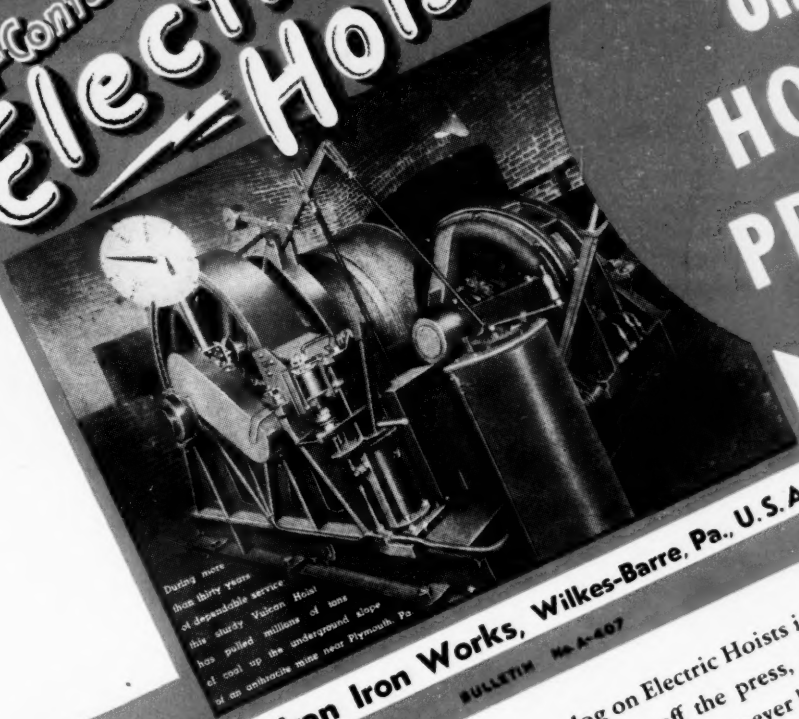


**GULF OIL CORPORATION • GULF REFINING COMPANY**

*Division Sales Offices:*

Boston • New York • Philadelphia • Pittsburgh • Atlanta  
New Orleans • Houston • Louisville • Toledo

# Self-Contained Electric Hoists



During more than thirty years of dependable service this sturdy Vulcan Hoist has pulled millions of tons of coal up the underground slope of an anthracite mine near Plymouth, Pa.

**Vulcan Iron Works, Wilkes-Barre, Pa., U.S.A.**  
BULLETIN No. A-407

New light  
on your  
**HOISTING  
PROBLEMS!**

Ask for  
free  
Bulletin  
A-407

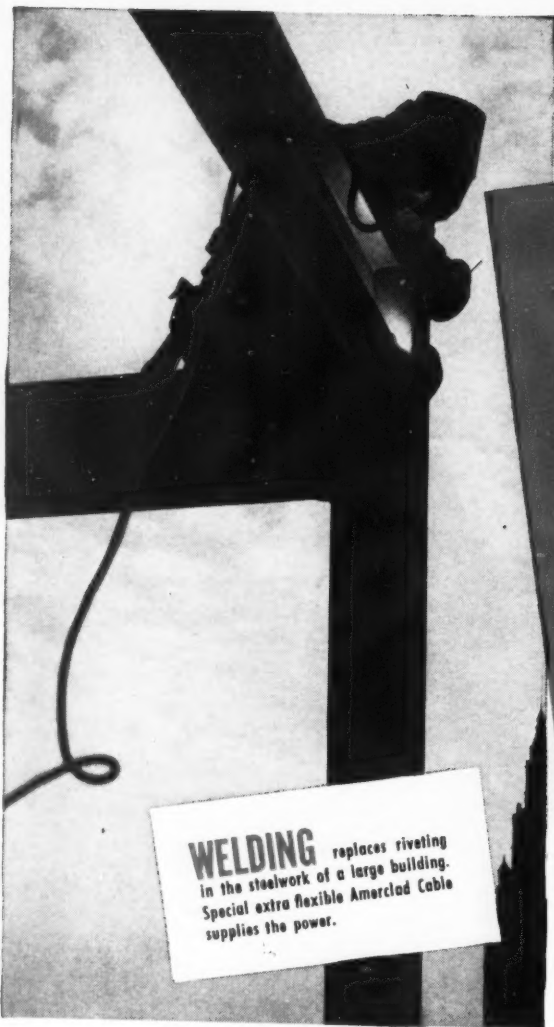
HEAVY-DUTY ELECTRIC HOISTS  
SELF-CONTAINED HOISTS  
SCRAPER HOISTS • CAR-SPOTTING HOISTS  
ROOM HOISTS • "ALLCASTEL" SHEAVES  
SHAKING-CHUTE CONVEYORS • CHAIN CONVEYORS  
CAGES, SKIPS, GUNBOATS • COAL-PREPARATION  
EQUIPMENT • STEAM LOCOMOTIVES • GASOLINE  
AND DIESEL LOCOMOTIVES • DIESEL-  
ELECTRIC LOCOMOTIVES • DIESEL-  
LOAD CARRYING LARRYS  
STEEL CASTINGS • STEEL FABRICATION

This comprehensive catalog on Electric Hoists is a "must" for every wide-awake mining man. Just off the press, it offers a wealth of specific information on Vulcan Hoists never before offered in print. In its 28 fact-filled pages you'll find Vulcan's complete story on Self-Contained Hoists, Scraper Hoists, Car-Spotting and Room Hoists. Vulcan's modern safety devices for Shaft and Slope Hoists get full coverage, too. And this information is especially timely now in view of steadily tightening safety requirements.

Highlights of Vulcan Heavy-Duty Hoists, "Allcastel" Sheaves, Cages and Skips, Slope Rollers and plant facilities all are outlined in this factual handbook. Studded with illustrations, detailed descriptions and pertinent tables, it's an invaluable source of information. Write today for your free copy. Specific inquiries are invited, also, on any of the Vulcan-manufactured equipment listed.

## Vulcan Iron Works

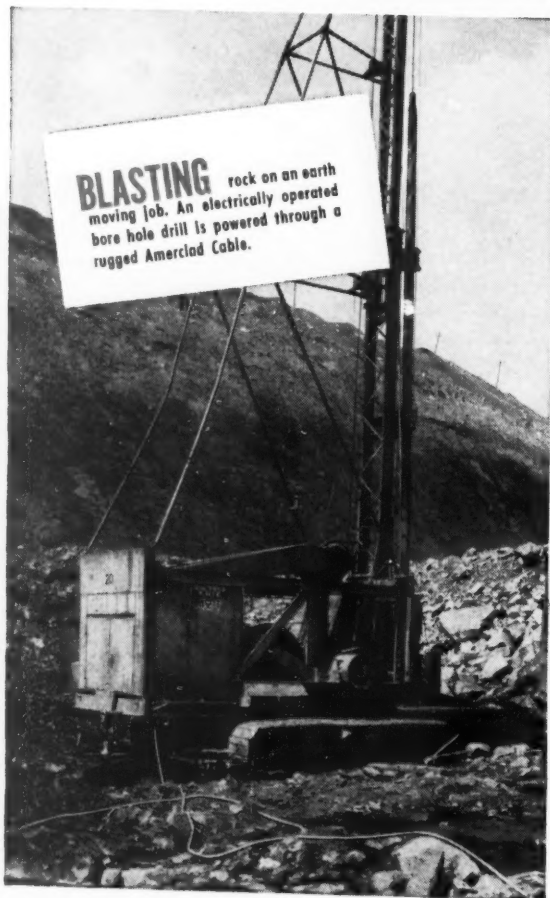
WILKES-BARRE, PA., U. S. A.  
Cable Address: "Vulworks, Wilkes-Barre."  
Branch Offices: New York, Chicago, Washington, D. C.



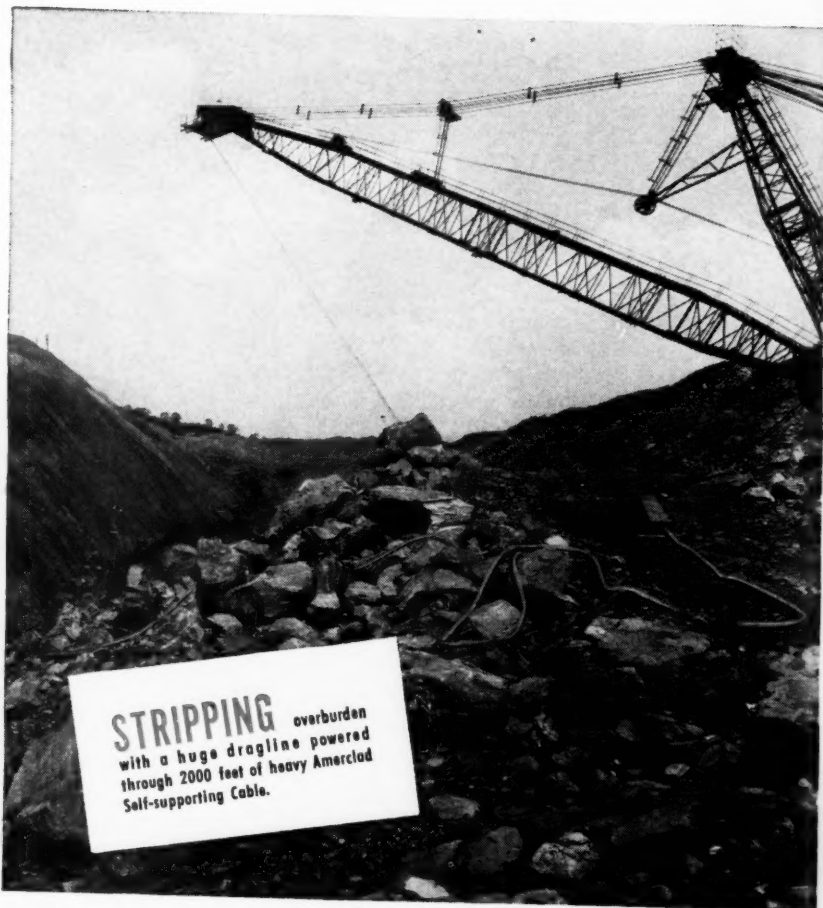
**WELDING** replaces riveting in the steelwork of a large building. Special extra flexible Amerclad Cable supplies the power.

Portable  
electrical machines multiply  
man's ability to produce

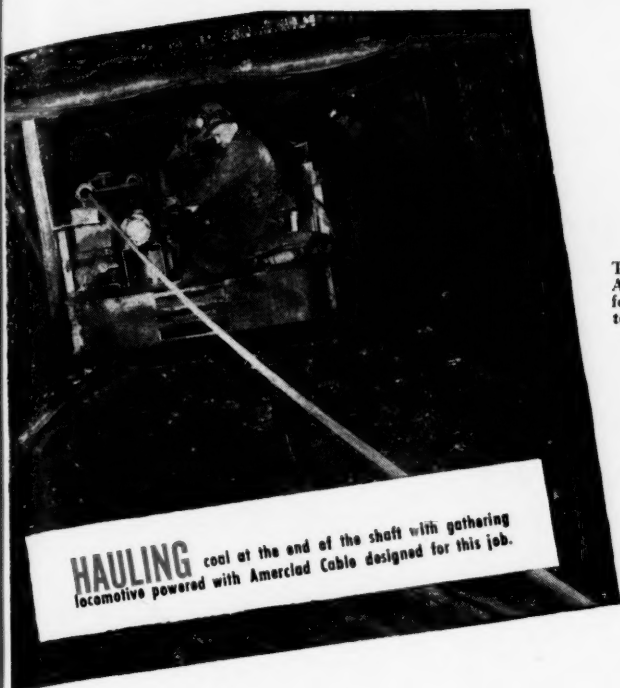
*... and these Better*



**BLASTING** rock on an earth moving job. An electrically operated bore hole drill is powered through a rugged Amerclad Cable.



**STRIPPING** overburden with a huge dragline powered through 2000 feet of heavy Amerclad Self-supporting Cable.



Three conductor portable Amerclad Cable reinforced with steel strand to give maximum strength.

Two conductor flat Amerclad Mining Locomotive Cable requires less space on the reel.



# Engineered U.S.S. Amerclad Cables keep power flowing!

ONE man with a hand shovel is high-priced labor. But give him a thousand-horsepower electric shovel and watch your costs come tumbling down.

Hundreds of portable machines from small electric handsaws to the world's largest electric shovels are now multiplying man's ability to produce at lower costs. All of this equipment requires electrical cables that can be dragged over rough surfaces or sharp rocks, through acid waters or hung from high cliffs.

To meet these severe conditions, engineers at American Steel & Wire Company have produced better electrical cables that can take all kinds of punishment and still deliver the kilowatts. U.S.S. Amerclad Portable Cable is made to withstand abuse of all kinds.

A certain contractor, for example, needed a cable that could support 200 feet of its own weight vertically and deliver 1500 kw. at the end of a half mile run. An Amerclad Cable was designed with three heavy copper conductors reinforced with three steel strands separated by the necessary insulation. The whole assembly was covered with tough tire-tread rubber so that it could be dragged anywhere. This cable has given remarkable service even though it has been run over repeatedly by heavy trucks.

If your job is different—as most of them are—let us know the conditions. Our engineers will design a cable that will give reliable service with maximum safety. Standard U.S.S. Amerclad Cables are designed with the same care and built to give the most service per dollar of cost.

## AMERICAN STEEL & WIRE COMPANY

*Cleveland, Chicago and New York*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*  
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*  
United States Steel Export Company, New York

## UNITED STATES STEEL

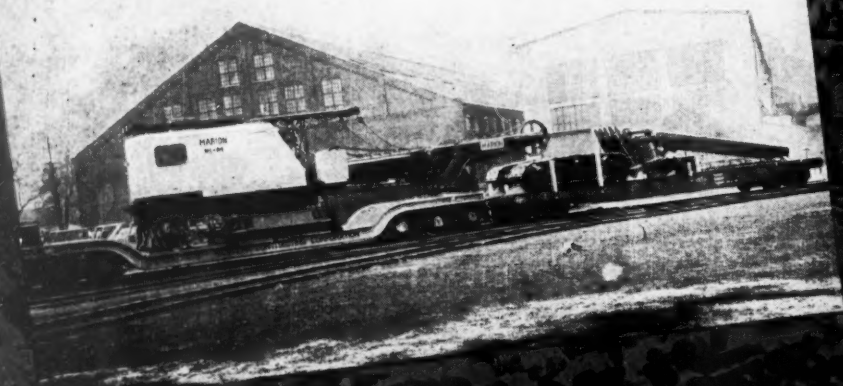
LISTEN to the United States Steel radio show every Sunday evening. Consult your local newspaper for time and station.



# U.S.S. AMERCLAD CABLE

*You asked for it! Here it is!*  
*A new, fast, powerful*

Here is a modern, heavy duty Diesel machine that is a top yardage producer in mining, quarrying, and heavy construction. It has the power—speed—and rugged strength to out-perform anything in its class under all digging conditions. It is a REAL MARION through and through. The MARION 111-M is easily and quickly convertible to dragline service. It ships without major dismantling. Let us tell you more about this outstanding performer.



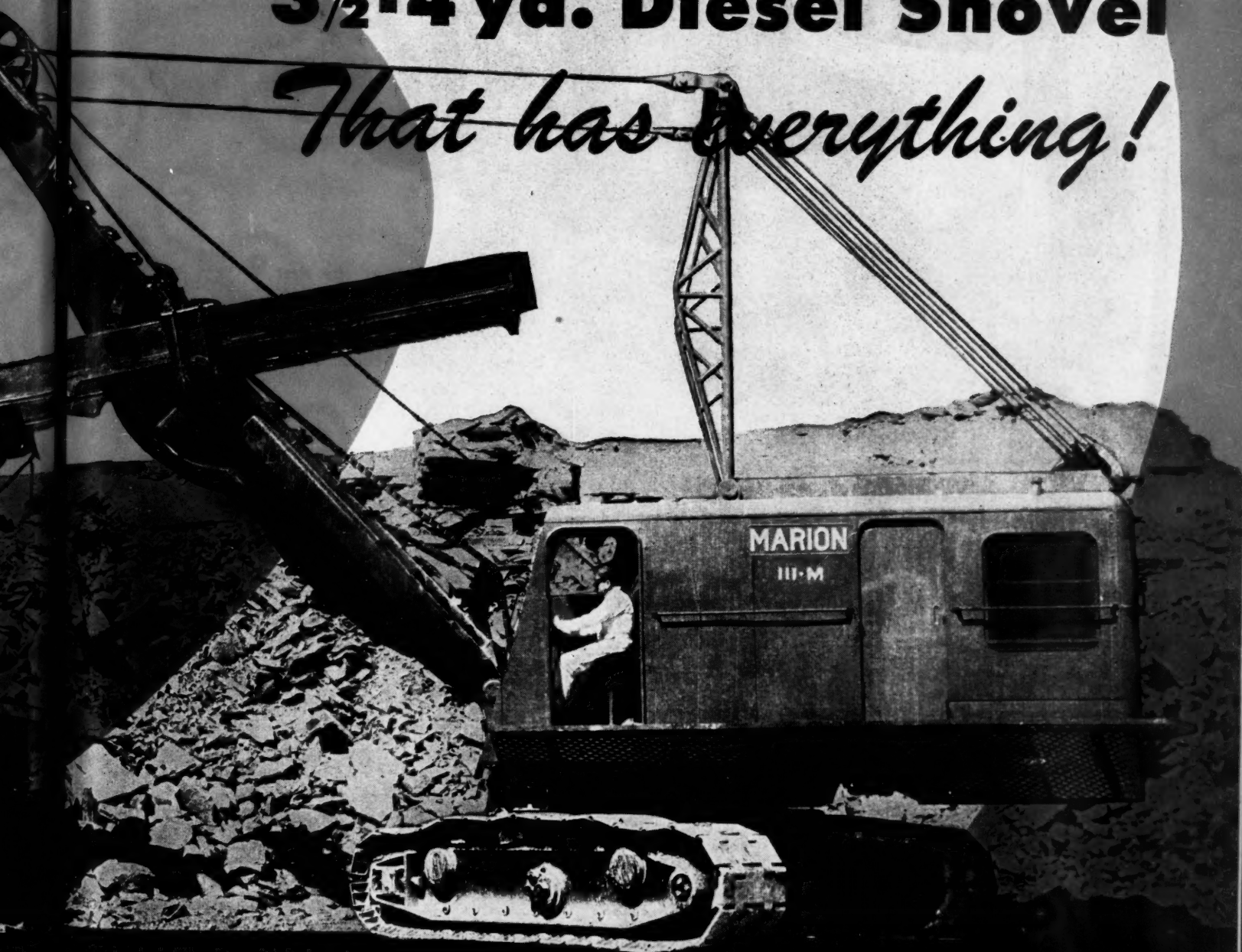
**MARION**

...it is!

**III-M**

**3½-4 yd. Diesel Shovel**

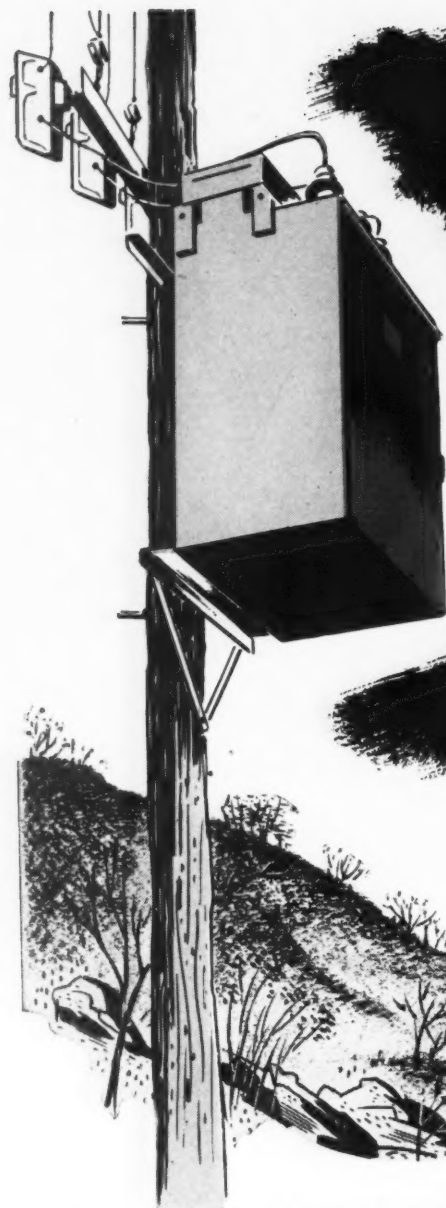
*That has everything!*



**POWER SHOVEL COMPANY**

Marion, Ohio, U.S.A.

Offices and Warehouses in all Principal Cities



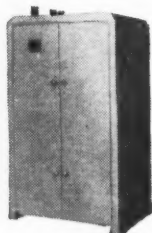
# Don't let Low Power Factor ... Kill YOUR

**"Saved \$2,000 in the first 4 months!"** reports one mine operator after he had installed G-E pole-type Pyranol capacitors at a cost of \$5,000.



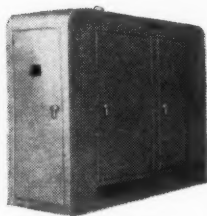
**Enclosed Capacitor Units**

Intended primarily for individual-motor or small-load application. Available in ratings from 0.5 to 7.5 kvar, 230 volts; 1 to 15 kvar, 460 and 575 volts—for single-, two-, or three-phase applications.



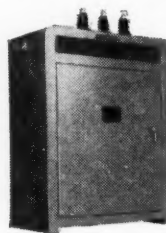
**Small Indoor Equipments**

These units occupy little space and can be suspended overhead, if desired. Available in single-, two-, or three-phase ratings up to 90 kvar, 230 volts; 180 kvar at 460, 575, 2400, 4160, 4800 and 7200 volts.



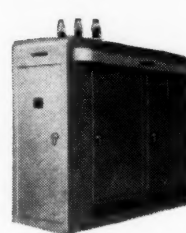
**Large Indoor Equipments**

Particularly desirable where one large block of capacity is desired. Available in ratings up to 630 kvar, 230 volts; up to 1260 kvar, 460 and 575 volts; and up to 2520 kvar, 2400 to 13,800 volts incl. Supplied either with or without circuit breakers.



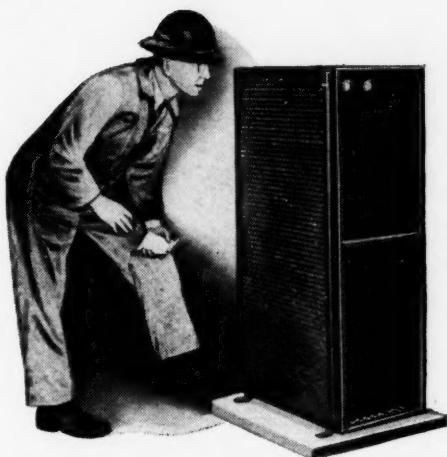
**Pole-type Outdoor Equipments**

Each unit has a completely weatherproof, all-welded steel housing suitable for either pole or base mounting. Designed for application to primary circuits of 2400, 4160, 4800 and 7200 volts in ratings up to 180 kvar, single-, two-, or three-phase.



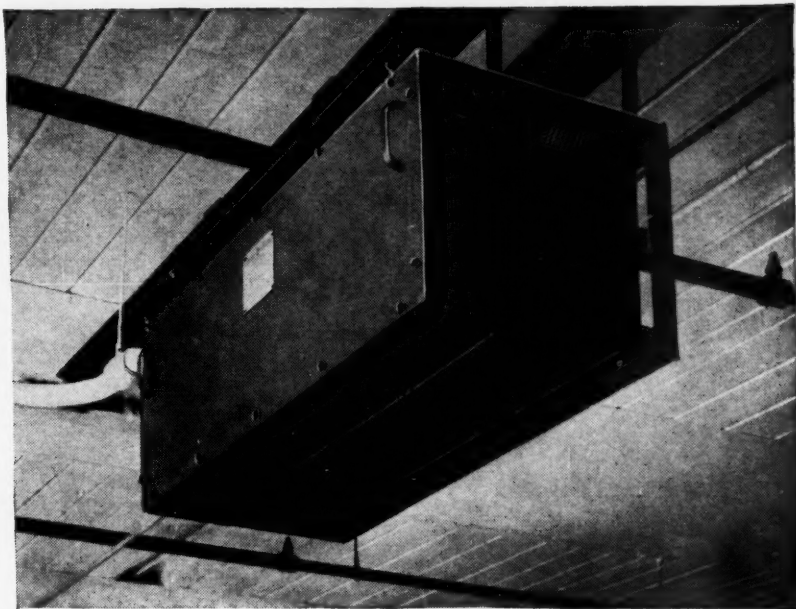
**Large Outdoor Equipments**

This type provides large blocks of power-factor-improvement capacity. Completely weatherproof. Supplied either with or without circuit breakers. Available in kvar, phase, and voltage ratings which duplicate large indoor equipments.



*In less than 2 years, this mining company had saved enough on its power charges to pay for its G-E capacitor installation.*

*Ceiling-mounted, dust-tight G-E capacitors save valuable floor space and can operate at high ambient temperatures.*



## MECHANIZATION GAINS!

★ **POWER FACTOR—THE CRITERION OF "WORKING" POWER WHICH YOU CAN IMPROVE WITH G-E PYRANOL CAPACITORS TO SECURE LOWER POWER COSTS AS WELL AS A HIGH RETURN ON YOUR INVESTMENT**

● The economies of mechanical mining can be seriously affected by a low power factor and the resulting high power costs. This needn't happen in your case—if you take advantage of the savings made possible by proper capacitor utilization. If you buy power from a utility and your contract contains a power-factor adjustment or kva-demand clause, capacitors can reduce your monthly bill by giving you more "working" power for every dollar you spend.

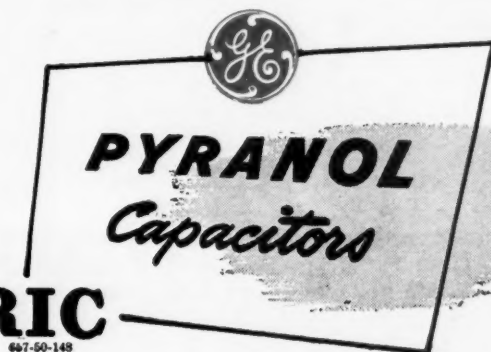
If you operate your own power plant, capacitors enable your generators to deliver more "payload" kilowatts—up to their maximum rating. In either case, they improve your voltage, reduce power losses, and help prevent system overloading. Very often, too, a capacitor installation permits the addition of more motors or other electrical equipment to a "fully loaded" system without the expense of additional feeders, transformers, or generators.

Users tell us that G-E capacitors return from 57 per cent to 120 per cent of their original cost every year. In other words, they pay for themselves many times over. Reliability of operation, of course, is essential

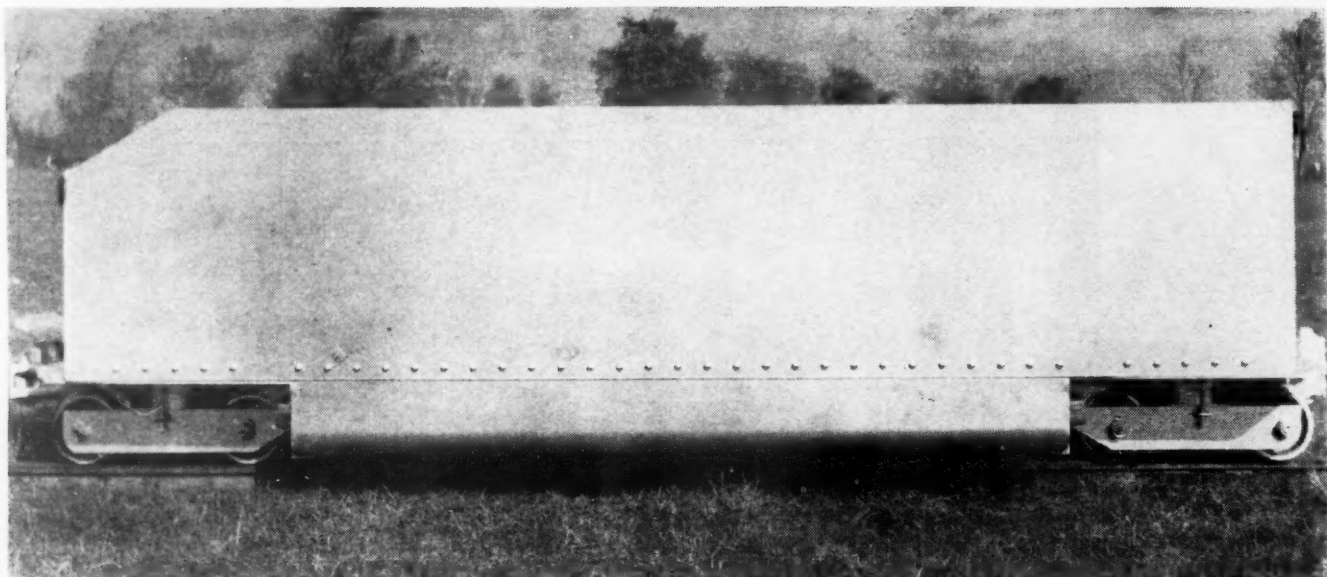
before you can realize any worthwhile savings and G-E Pyranol capacitors are noted for the care and precision used in their manufacture. They're non-inflammable, hence less expensive to install. They are smaller than other types, require less space. And they have stable operating characteristics that assure long life.

Applying capacitors to secure maximum savings in mines, on surface properties, and in preparation plants requires careful study of your existing and anticipated circuits and power demands. General Electric engineers, because of their wide experience in this field, are able to render this service. Why not get in touch with the G-E office nearest you? Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

**GENERAL  ELECTRIC**



667-50-148



**DIFFERENTIAL MINE CAR**—These large capacity mine cars with Differential patented AXLESS truck substantially increase the capacity of the loading machines by reducing the number of car changes. The AXLESS truck not only extends the life of the wheels, but its gentle spring section reduces car maintenance. The easy riding quality allows for a large topping on the cars without shaking off. The extreme roadability of the AXLESS truck allows for greatly increased speed and its inherent ability to stick to the track greatly improves safety records.

#### DIFFERENTIAL MINE LOCOMOTIVES

This heavy duty high speed 360 HP locomotive utilizes a Differential AXLESS truck allowing higher speeds with safety, easy riding quality and increased drawbar pull.

On curves the wheels do not slip, therefore adhesion remains constant. The 8-wheel AXLESS principle and the easy riding quality prevents the locomotive from pounding the track out of line and surface.



#### DIFFERENTIAL LARRIES

Differential man trip car allows your crew to be hauled to and from work with greater speed, safety and comfort. These cars are fitted with the Differential AXLESS truck, giving good riding quality, long wheel life, and extreme roadability. Protects against roof falls, contact with trolley wire and gives men a dry, comfortable, safe place to ride, sheltered from cold intake air.



#### DIFFERENTIAL LARRIES

These larries are supplied in a number of sizes to fit almost any refuse disposal condition. Generally they are 3-way dump, dumping to both sides and over the end. The end dumping feature allows the dump to be extended without the use of cribbing and the elevation of the dump is maintained by plowing material into the track using the end door as a plow.

## DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO, U. S. A.

Builders of Haulage Equipment Since 1915

AIR DUMP CARS

MINE CARS

MINE LOCOMOTIVES

ROCK LARRIES

DUMPING DEVICES

BURDEN-BEARING LOCOMOTIVES

STOCKPILING CARS

COMPLETE HAULAGE SYSTEMS

# CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

Meets Every Challenge of Today's Production Requirements



● The advantages of the CARDOX mining method manifest themselves at practically every stage of production. Benefits are particularly outstanding in fully mechanized mines.

For example, the extra *forward roll* of coal broken down with CARDOX permits the use of longer cutter bars . . . to provide 16% to 50% more coal at each cut for the loading machine. This saves 16% to 30% of the *non-productive* time spent each day in moving loading machines.

In addition, CARDOX eliminates time losses caused by smoke and noxious fumes . . . reduces the hazards of fire roof and rib failures . . . makes possible savings in cleaning time and costs because of the higher percentage of coarse sizes produced by its gentle heaving action.

Write for full details on free demonstration in your own mine.

## CARDOX

### Hardrock Drilling Equipment

Complete line of drilling  
equipment designed to  
give you the maximum  
drilling efficiency.

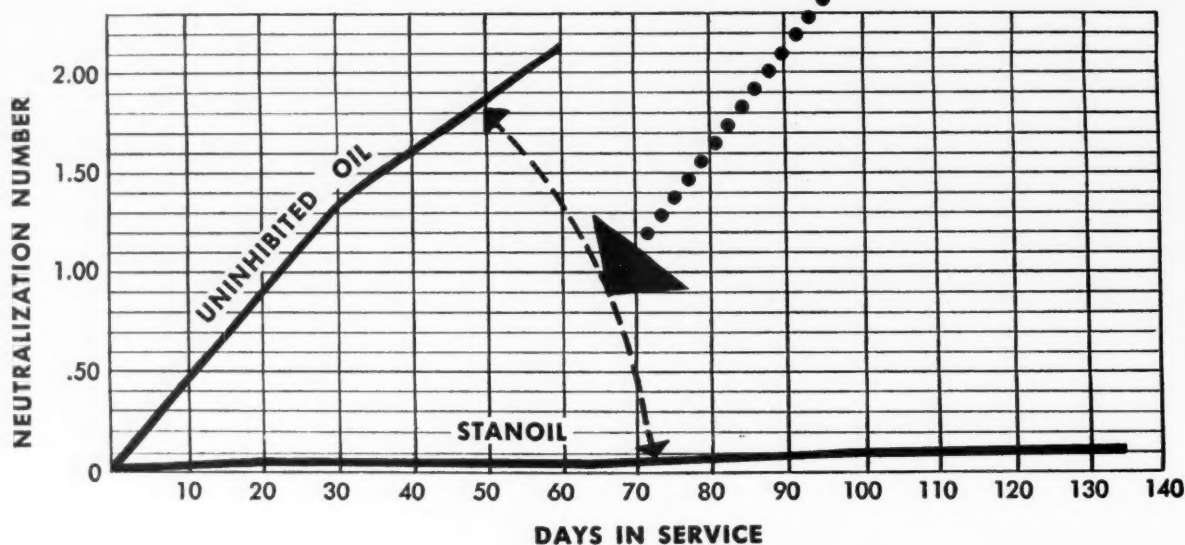
CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS



# Here's the difference between uninhibited oils and

## Improved

## STANOIL



***Oil lasts longer in gear cases . . . in bearings***

***. . . in compressors . . . and hydraulic systems***

THE CHART above shows the operating record of two oils in a speed reducer on an induced draft fan. Operating conditions were severe, as the fan ran 24 hours a day—so severe that a straight, uninhibited oil lasted only 60 days before acidity reached 2.15 mg.KOH/gm and the oil had to be replaced.

This was one spot chosen to test Improved STANOIL—a high quality mineral oil to which an oxidation inhibitor is added. The second curve shows the results. After 135 days of operation the neutralization number of the

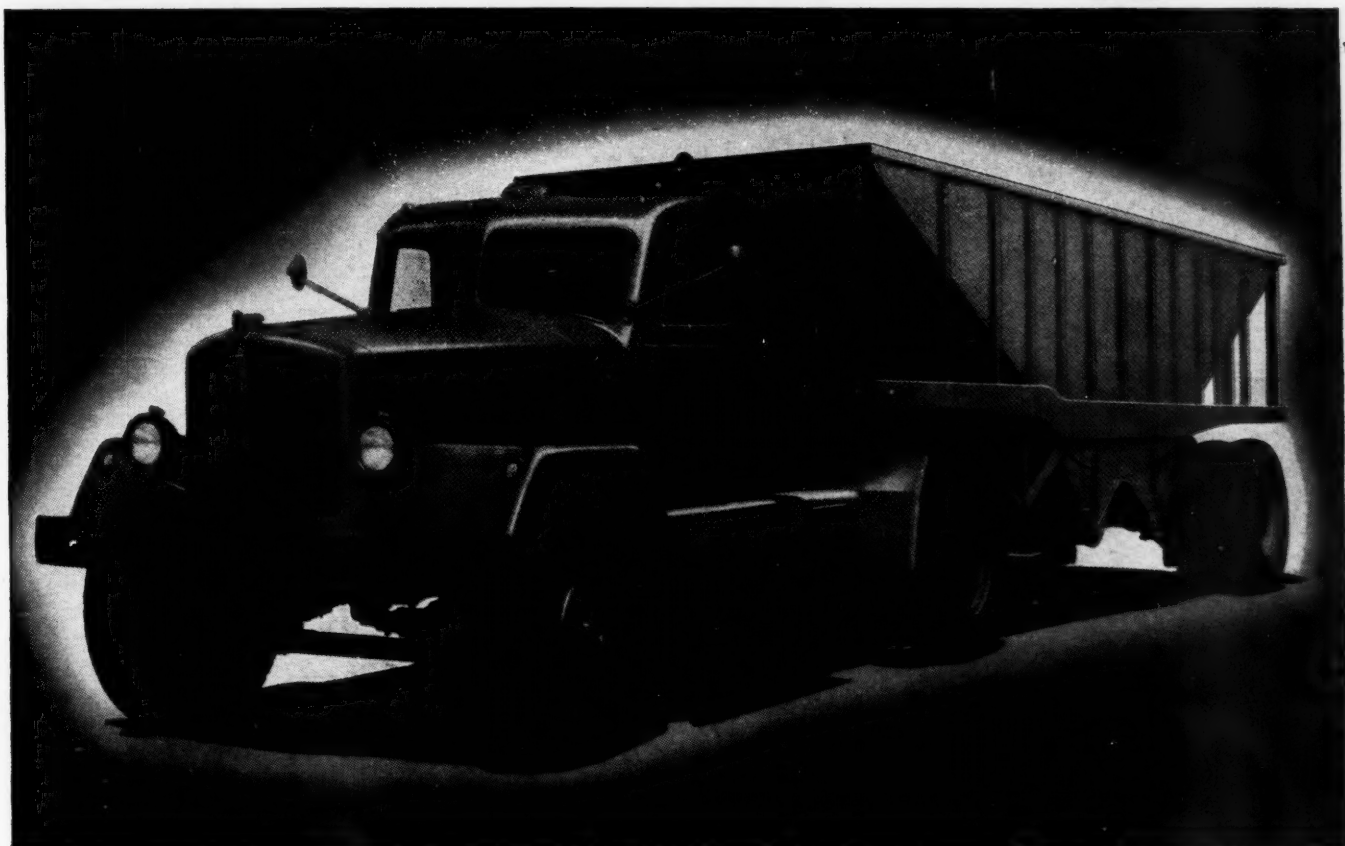
oil did not go over 0.15.

Deposits, corrosion and acidity caused by oil oxidation have been reduced in service tests on all types of equipment. A Standard Oil Lubrication Engineer will be glad to give you further information on Improved STANOIL and suggest installations in your plant where this oil can save machine down-time, oil replacements and wear. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

**STANDARD OIL COMPANY (INDIANA)**

**STANDARD  
SERVICE**

*"That* hill? Man, this big, new  
Ward LaFrance flattens *all* hills!"



Tug Hill, Howlett Hill, Long Hill, *any* hill — you can depend on the big, new Ward LaFrance heavy duty trucks. They're rugged, reliable and packed with power.

For economical hauling your best bet is a Ward LaFrance. Winter or Summer — 30° below or 110° in the shade — your Ward LaFrance will give you consistent performance day after day.

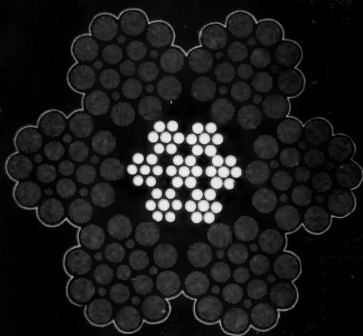
The new Ward LaFrance trucks and over-the-road tractors, both gasoline and Diesel, are designed, engineered and manufactured to meet all hauling requirements with maximum efficiency. Built to take a beating and stay on the job, these dependable trucks are setting new records for stamina and reliability.

For complete information about these trucks that are setting new standards of performance, see your local dealer. If no dealer has yet been appointed in your community, write direct to factory.

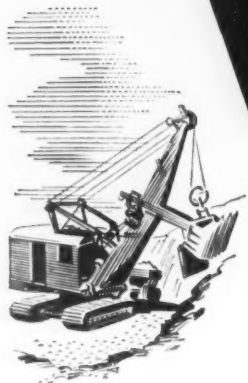


**WARD LA FRANCE TRUCK DIVISION**  
**Great American Industries, Inc.**  
**ELMIRA, NEW YORK**

# Resists Abuse Better...



## UPSON-WALTON IWRC\* WIRE ROPE



**F**OR winch lines on trucks and tractors . . . for hoist lines on power shovels and in-haul ropes on draglines . . . for hot ladle cranes in steel mills and foundries . . . for cable scrapers, stump pulling ropes, rotary drilling lines for oil wells, mining machines—industry after industry operates under conditions which require IWRC (\*Independent Wire Rope Center) construction to do the best job.

IWRC construction resists crushing better where ropes crosswind on drums, retains its circular cross section when bent around small sheaves and drums under extra heavy loads. It resists stretching, resists heat and increases the ultimate strength of the rope itself.

IWRC construction is available in every type of wire rope made by Upson-Walton.

For best performance, select the U-W rope best suited to your needs and specify *IWRC, Perfection Grade, Layrite Preformed*.



Established 1871

*All Upson-Walton Products Available  
Through Your Local Upson-Walton Distributor*

Copyright 1946—The Upson-Walton Company

### THE UPSON-WALTON COMPANY

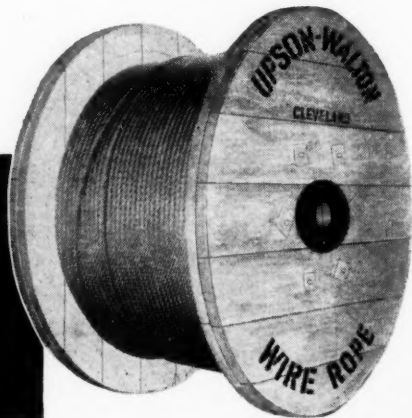
*Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks*

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

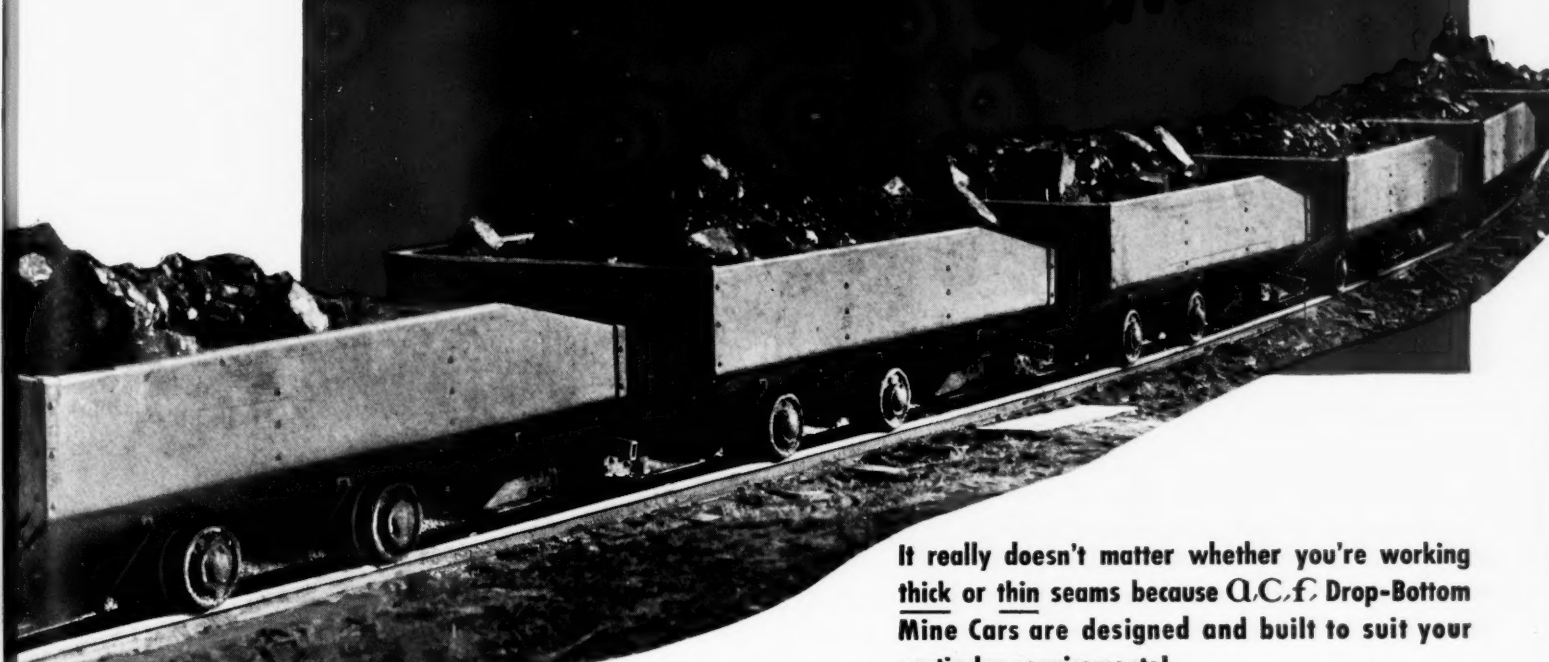
114 Broad Street  
New York 4

737 W. Van Buren Street  
Chicago 7

241 Oliver Building  
Pittsburgh 22



# LOWER COSTS PER TON



It really doesn't matter whether you're working thick or thin seams because A.C.F. Drop-Bottom Mine Cars are designed and built to suit your particular requirements!

**a.c.f.**  
**DROP-BOTTOM**  
**MINE CARS**

**R**EGARDLESS of car height, you get a strong, sturdy, well-built car, with plenty of stamina—with heavy-duty, double action spring bumpers—with doors that are "lubricated"—with anti-friction bearings in the wheels!

The unusual speed at which A.C.F. drop-bottom cars can be dumped makes them especially suited to mechanical mining. Rapid, automatic unloading at the dump hopper allows quick return of cars to the loading point—provides greater loading machine efficiency—permits lower production costs per ton!

Our sales representatives are anxious to discuss the advantages of this type car with you—for use in *thick* or *thin* seams!

**AMERICAN CONVEYOR COMPANY**

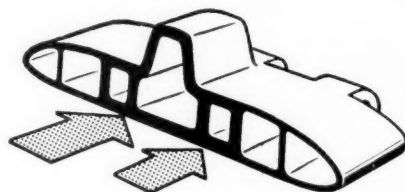
New York • Chicago • St. Louis • Cincinnati • Philadelphia • Pittsburgh • Huntington, W. Va.



Ninety thousand pounds shovel weight plus 30,000 pounds digging load — and any one of the 66 hardened cast alloy shoes can take the whole 120,000 pounds. So strong, they'll outlast unhardened high carbon steel shoes at least three to one.

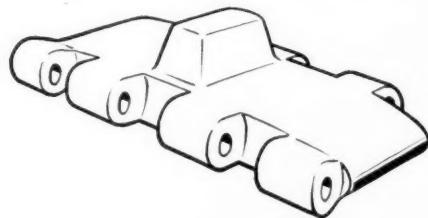
### *Double Thick* WHERE THEY TAKE THE LOAD

Cross section shows double thick crawler roller paths, rigidly supported by double thick inside ribs. Cast, seamless, this shoe takes loads as a unit. Heat-treated alloy has basic strength, ductility to ride out shock loads, hardness to resist abrasion.



### *Self-Cleaning*, OF COURSE! NO DIRT TRAPS

Like the shoes on Koehring equipment for 25 years, the hardened cast alloy shoes on the Koehring 605 have no dirt traps. Smoothly streamlined, they shed mud and stones and won't shower grit on the crawler belt rollers.



**KOEHRING COMPANY** • Milwaukee 10, Wisconsin

**HEAVY-DUTY CONSTRUCTION EQUIPMENT**





## DOUBLE-TIME DUTY WITH.. TWIN BWH CONVEYOR BELTS!

Like many another company, a Midwest power producing plant was called on to increase vastly its output in the war years. In doing it, equipment took an awful beating... and these BWH twin conveyor belts worked double time—16 full hours a day, year after year. In addition, the belt speed was increased one third... but these rugged belts took it in their stride.

Multiplied instances like this have proved that BWH Conveyor Belts are able to absorb more punishment than they were originally designed to take. Made by the famous ROTOCURE process of continuous vulcanization, they have won the unquali-

fied acceptance of many leading companies over the country.

When next you need a conveyor belt, look to BWH for dependable ruggedness... BWH distributors for dependable service!

### HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems... we're specialists in solving them. Consult your nearest BWH distributor, or write to BWH direct.



# BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in All Principal Cities

WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.



## “Who says there’s no coal in pork chops?”

**D**O pigs eat COAL? Some do! Take a look at this picture And it’s no publicity stunt, either.

Lots of pigs eat COAL for its mineral content. Farmers say their pigs love it—and buy COAL especially to scatter about the pens.

But the big market for coal, where pigs are concerned, is in the packing industry. When pigs become pork, millions of tons of COAL a year are

used for heat, hot water, steam, and power essential to processing meat products.

COAL not only helps prepare the foods most people eat, but pumps the water they drink—provides most of the electricity they use—keeps the fires burning in most of their furnaces, ranges, gas stoves—is the source of new textiles and colors for the Easter parade.

COAL enters vitally into virtually

everything by which modern America lives, moves, works, plays. Fortified by this immense range of utilization, the future of COAL is secure.

Not a pound of any fuel other than COAL is burned in any of the Chesapeake and Ohio’s hundreds of locomotives! When you ship your coal via the Chesapeake and Ohio you can be sure that every ton is hauled exclusively by power from COAL!

## THE CHESAPEAKE AND OHIO RAILWAY

*“The 100% Coal Railroad”*

*He's as close  
as your phone...*

**with Answers to Many of Your**

## **CABLE PROBLEMS**



IT'S AS SIMPLE AS THAT. When you're faced with a tough cable problem or wiring job, chances are you'll solve it in less time . . . with less trouble . . . by phoning your nearest Roebling branch office.

A Roebling field engineer is well qualified to analyze and advise on unusual wiring needs. He can tell you what performance to expect of each type wire or cable . . . what's available right now . . . what's likely to be on hand soon . . . what can be specifically recommended to meet the operating conditions.

Maybe he can even answer your problem by phone. But in any event, he's always ready to come out to the job and offer helpful suggestions first-hand. Add his specialized knowledge of wires and cables to *your* knowledge of the job's requirements . . . and the result is a simple short-cut to long, efficient cable performance.

Roebling field engineering service is *dependable* . . . and doesn't end with an order. Ask us about it.

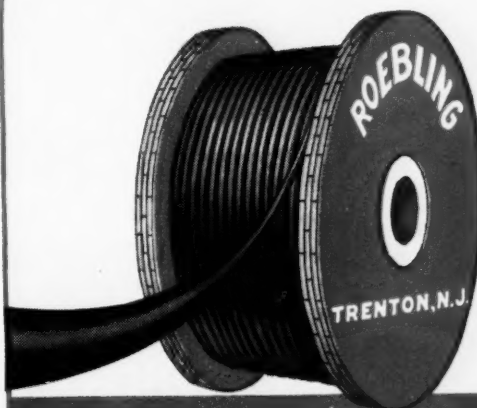
**JOHN A. ROEBLING'S SONS COMPANY**  
TRENTON 2, NEW JERSEY

*Branches and Warehouses in Principal Cities*

**YOUR ROEBLING FIELD ENGINEER IS  
ALWAYS READY TO SERVE YOU...**

Atlanta, Ga. ....	934 Avon Avenue—Raymond 2151
Boston 10, Mass. ....	51 Sleeper Street—Lib. 4373
Chicago 6, Ill. ....	600 W. Jackson Blvd.—Rand. 1971
Cleveland 14, Ohio ....	701 St. Clair Ave., N.E.—L.D. 249 & Main 5030
Denver 17, Colorado ....	1635 Seventeenth St.—East 2684
Houston 1, Texas ....	6216 Navigation Blvd.—Woodcrest 6-8316
Los Angeles 54, Calif. ....	216 S. Alameda Street—Trinity 1261
New York 6, N. Y. ....	19 Rector Street—Wh 3-5200
Philadelphia 7, Pa. ....	12 S. 12th Street—Market 2751
Pittsburgh 12, Pa. ....	855 W. North Avenue—Fairfax 2766
Portland 9, Ore. ....	1032 N.W. 14th Avenue—Broadway 5456
San Francisco 1, Calif. ....	1740 17th Street—Market 8787
Seattle 4, Wash. ....	900 First Avenue, South—Main 4992

**KEEP THIS INFORMATION HANDY FOR FURTHER REFERENCE**



# **ROEBLING**

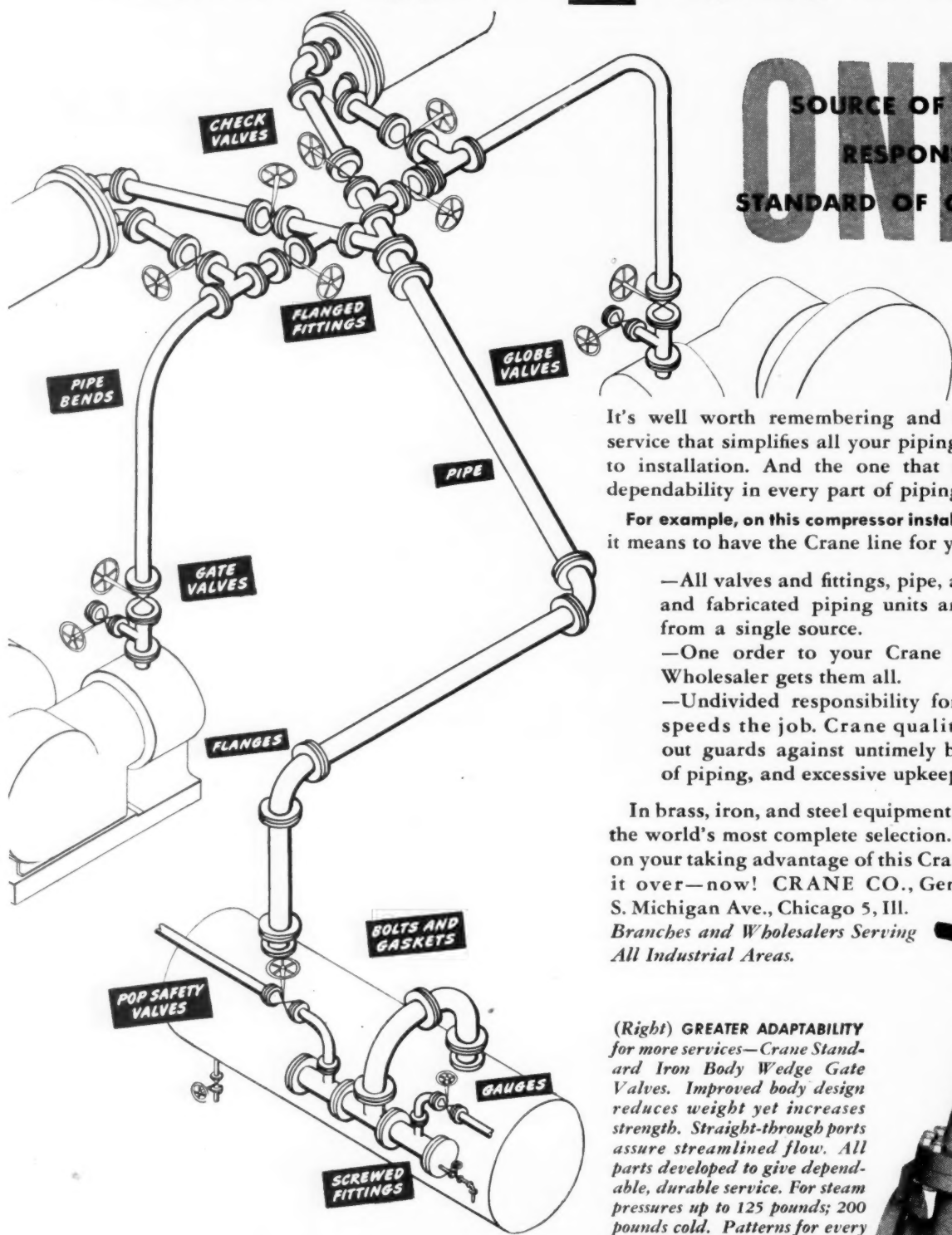
**ELECTRICAL WIRES AND CABLES**

Weatherproof Wire • Service Entrance Cables • Rubber-Covered Wires and Cables (Including Small Diameter Building Wires and Cables)  
Rubber Sheathed Portable Cables • Rubber Insulated Power Cables • Magnet Wire • Telephone Wires • Pigtail and Braided Copper • Trolley  
Contact Wire • Bare Copper Strand • Varnished Cambric Power Cables.



# WORTH REMEMBERING!...

## CRANE Supplies all Piping Materials



**ONE**  
SOURCE OF SUPPLY  
RESPONSIBILITY  
STANDARD OF QUALITY

It's well worth remembering and using now—the service that simplifies all your piping jobs from plan to installation. And the one that assures uniform dependability in every part of piping systems.

For example, on this compressor installation, look what it means to have the Crane line for your partner:

- All valves and fittings, pipe, accessories, and fabricated piping units are specified from a single source.
- One order to your Crane Branch or Wholesaler gets them all.
- Undivided responsibility for materials speeds the job. Crane quality throughout guards against untimely breakdowns of piping, and excessive upkeep.

In brass, iron, and steel equipment, Crane gives you the world's most complete selection. There's no limit on your taking advantage of this Crane service. Think it over—now! CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. Branches and Wholesalers Serving All Industrial Areas.

(Right) GREATER ADAPTABILITY for more services—Crane Standard Iron Body Wedge Gate Valves. Improved body design reduces weight yet increases strength. Straight-through ports assure streamlined flow. All parts developed to give dependable, durable service. For steam pressures up to 125 pounds; 200 pounds cold. Patterns for every need. See Crane Catalog, page 101.



EVERYTHING FROM ...

VALVES • FITTINGS  
PIPE • PLUMBING  
HEATING • PUMPS

# CRANE

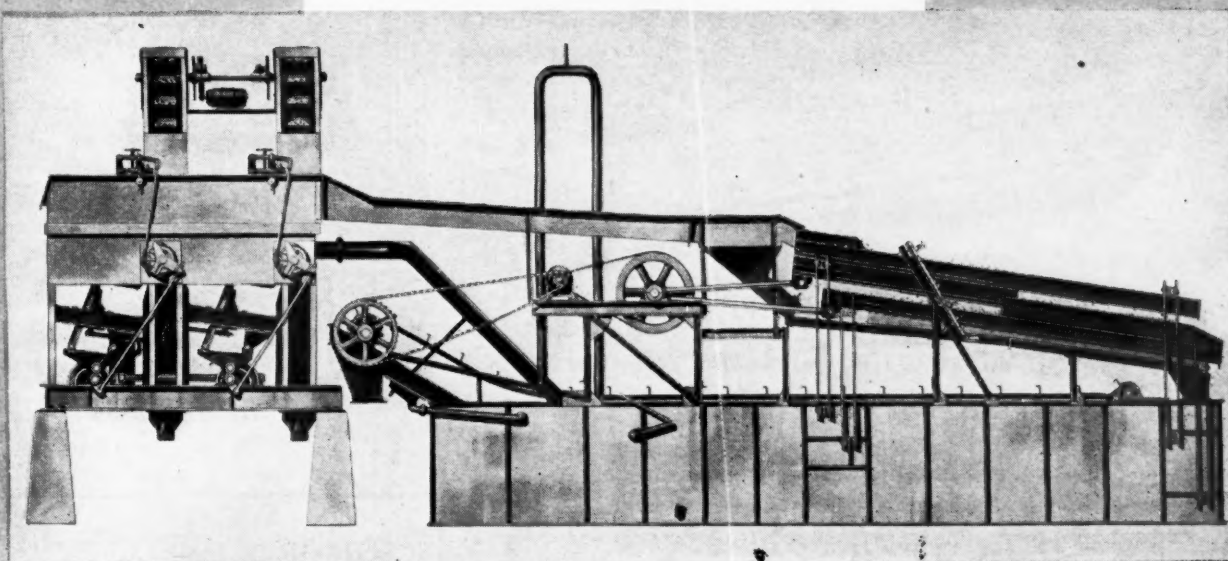
FOR EVERY PIPING SYSTEM

# Jeffrey

## No. 200

# UNIT

# WASHERY



(Patented)

The newest Jeffrey combination unit. Washes and dewater coal—75 to 200 T. P. H. Consists of a two-compartment diaphragm jig, self-contained dewatering and sizing screen, steel clarification tank with recovery conveyor and water circulating system.

# THE JEFFREY

## MANUFACTURING COMPANY

912-99 NORTH FOURTH ST., COLUMBUS 16, OHIO

Baltimore 1	Buffalo 2	Cleveland 13	Harlan	Milwaukee 11	Pittsburgh 22
Birmingham 3	Chicago 1	Denver 2	Houston 5	New York 7	St. Louis 3
Boston 15	Cincinnati 2	Detroit 12	Huntington 12	Philadelphia 2	Salt Lake City 1
					San Antonio 2

ESTABLISHED  
1877



# The Case of the DANCING DOLLS



## —Or How ATLAS ROCKMASTER Reduces Vibration While It Also Increases Shovel Production

A coal stripping operation in the midwest caused serious complaints from neighbors when the overburden was shot. In a nearby country store, the vibration was especially objectionable. Every time a shot was made, a string of novelty dolls in the window danced furiously, and sometimes fell to the floor.

When the Atlas Rockmaster blasting system was introduced in this coal pit, complaints ceased. And the dolls stopped dancing, too, giving visible evidence that vibration had been substantially reduced.

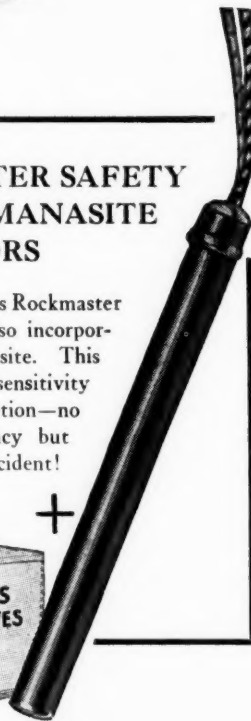
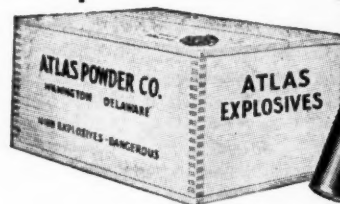
This case history, characteristic of many, is just one example of how Atlas Rockmaster blasting system has been used to reduce complaints about blasting. In addition, the new and better control of blasting definitely gives increased rock breakage in many types of operations, with resulting increased shovel efficiency.

Atlas does not claim that Rockmaster is the answer to every blasting problem. But with your knowledge of the job, and our knowledge of explosives, Rockmaster can very probably save you time and trouble. Call in the Atlas Representative.

"ROCKMASTER"—Trade Mark

### THE GREATER SAFETY OF ATLAS MANASITE DETONATORS

Remember, the Atlas Rockmaster Blasting System also incorporates Atlas Manasite. This means decreased sensitivity to impact and friction—no sacrifice of efficiency but less chance of accident!



# ATLAS

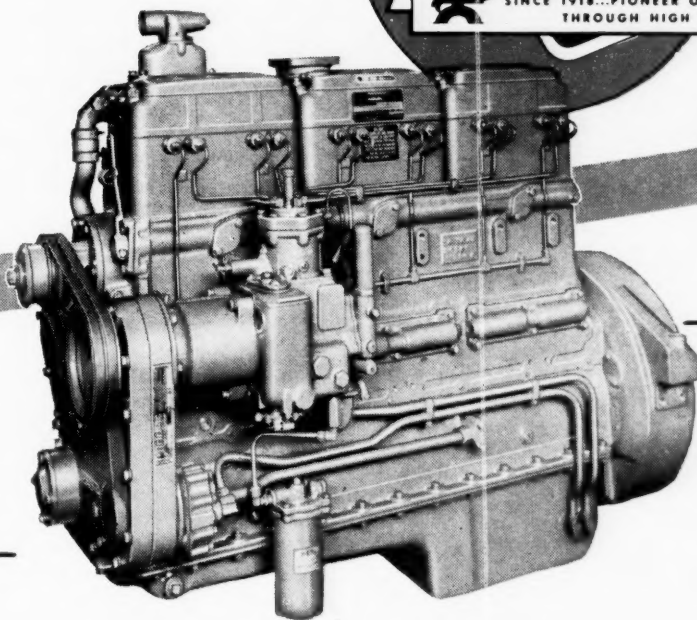
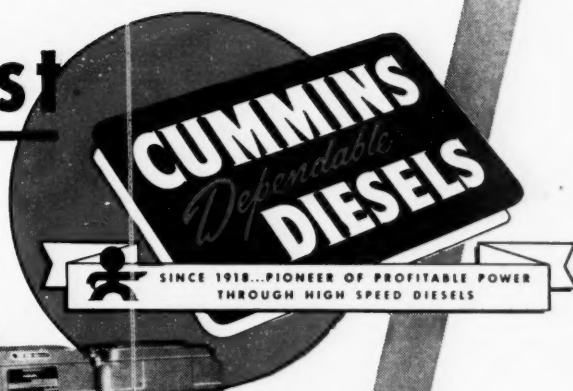
## EXPLOSIVES

"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

**Value  
ahead of volume  
assures  
the finest**



**CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA**

COAL AGE • July, 1946

**T**his type of service makes a pretty picture, but it's rough on rope. In a plane installation, the rope gets it going and coming—not only the normal wear encountered on sheaves and drums, but the highly abrasive kind dealt out by rocks, ties, rollers.

Bethlehem can help you select the correct wire rope for your incline planes. You'll want a coarse outer-wire construction so that the rope will better withstand abrasion. You'll want as much flexibility as you can possibly get in a large rope with heavy crown wires. The choice of lay is a specialized problem in itself, and must be governed by the type of equipment you use.

Questions like these are everyday matters with Bethlehem engineers. At your request, a Bethlehem man will be glad to look over your set-up and help you check your roping needs. If you'd like this service, give us a ring. No obligation at all.



Bethlehem makes every kind of mining rope . . . big or small. Get our recommendations for planes, slopes, shaft hoists, mining machinery, scraper mucking, etc.

**When you think WIRE ROPE . . . think BETHLEHEM**

# examine this "Explosion-tested" locomotive

... FOR SAFER OPERATION IN GASEOUS MINES

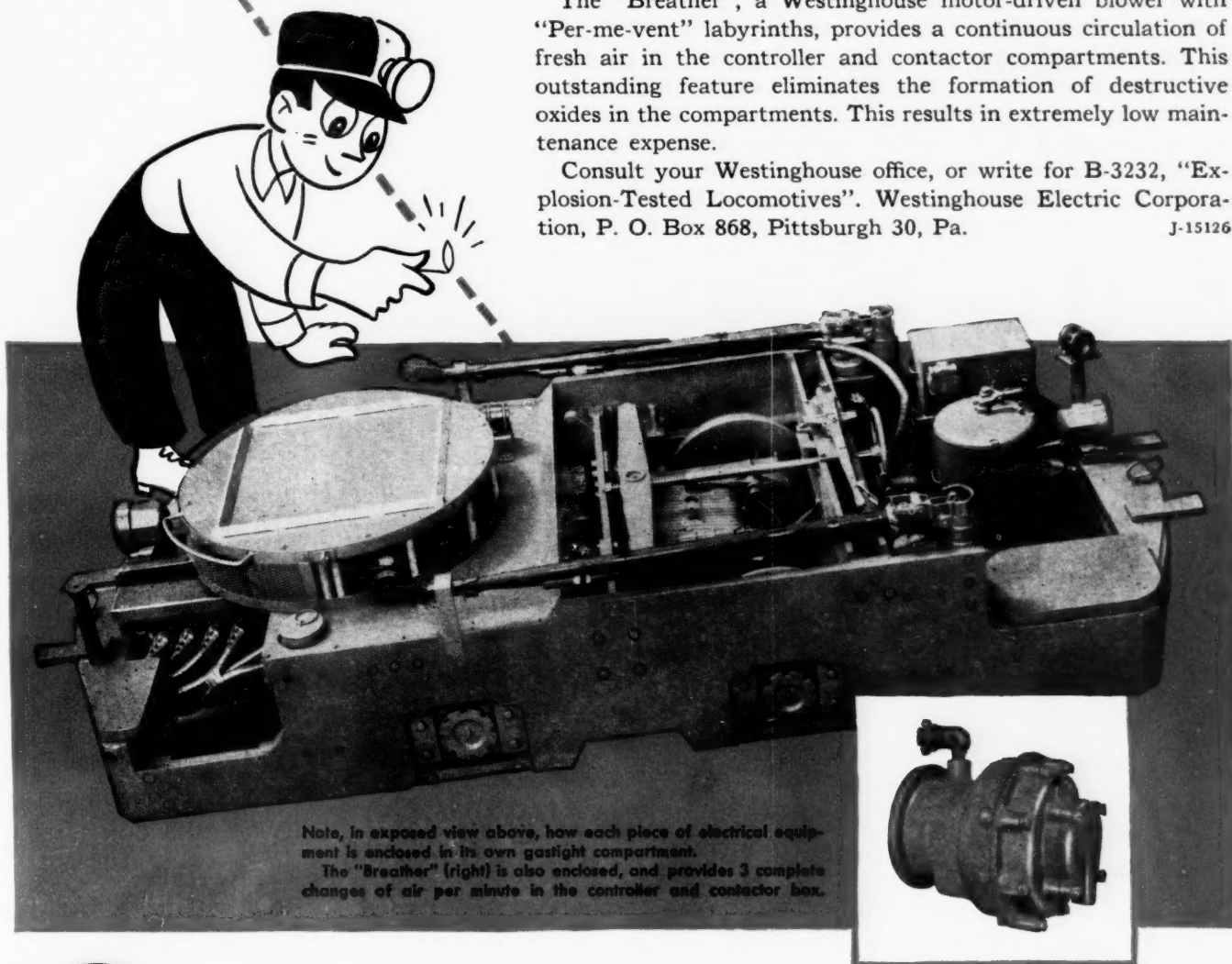
Look a little closer . . . this is not an ordinary mine locomotive! Its basic design features have been so widely accepted they are becoming a standard for the mining industry. These locomotives are engineered, tested and proved safe for operation in mines where gas may suddenly accumulate in explosive quantities or mixtures.

**Safer . . .** because each piece of electrical apparatus is enclosed in its own compartment . . . *explosion-tested* to withstand internal explosions of gas (methane) and coal dust without transmitting flame to the outside atmosphere.

The "Breather", a Westinghouse motor-driven blower with "Per-me-vent" labyrinths, provides a continuous circulation of fresh air in the controller and contactor compartments. This outstanding feature eliminates the formation of destructive oxides in the compartments. This results in extremely low maintenance expense.

Consult your Westinghouse office, or write for B-3232, "Explosion-Tested Locomotives". Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-15126



Note, in exposed view above, how each piece of electrical equipment is enclosed in its own gastight compartment.

The "Breather" (right) is also enclosed, and provides 3 complete changes of air per minute in the controller and contactor box.



**Westinghouse**  
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

## Mine Locomotives

*This fact has a  
definite reason behind it*

## Your GATES VULCO ROPES Are Today Making Performance Records **NEVER EQUALED by ANY V-Belts Before!**

No V-Belts built by *anyone* before the war had anywhere near the strength and durability that was found necessary on U. S. Army tanks, tractors and self-propelled big guns during the war. Gates developed these greatly superior V-belts for Army use—and here is why this fact is important to industrial users of V-belts: —

*Here is  
the reason*

Every improvement developed by Gates for U. S. Combat Units—and many later improvements, also—have been added, day by day, to the quality of the Standard Gates Vulco Ropes which have been delivered to you.

That is why, *long before the war was over*, you were getting in your Standard Gates Vulco Ropes a product built to far higher service standards than any V-belts ever built by anyone before the war.

And that is not all of the story. Through continuing *specialized* research, the service qualities of these superior Gates Vulco Ropes have been still further improved as all of Gates facilities and energies have been returned to the service of industry.

These are the simple reasons why you are finding that your Gates Vulco Ropes are today outperforming any V-Belts you ever used before.

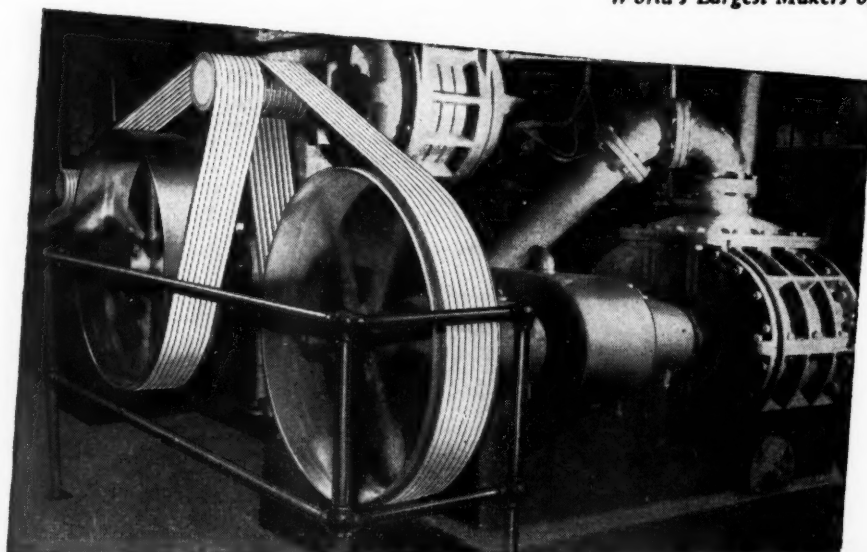
**THE GATES RUBBER COMPANY**  
DENVER, U. S. A.

*World's Largest Makers of V-Belts*

All Gates  
V-Belts are  
Built With  
The Patented



THE MARK OF SPECIALIZED RESEARCH

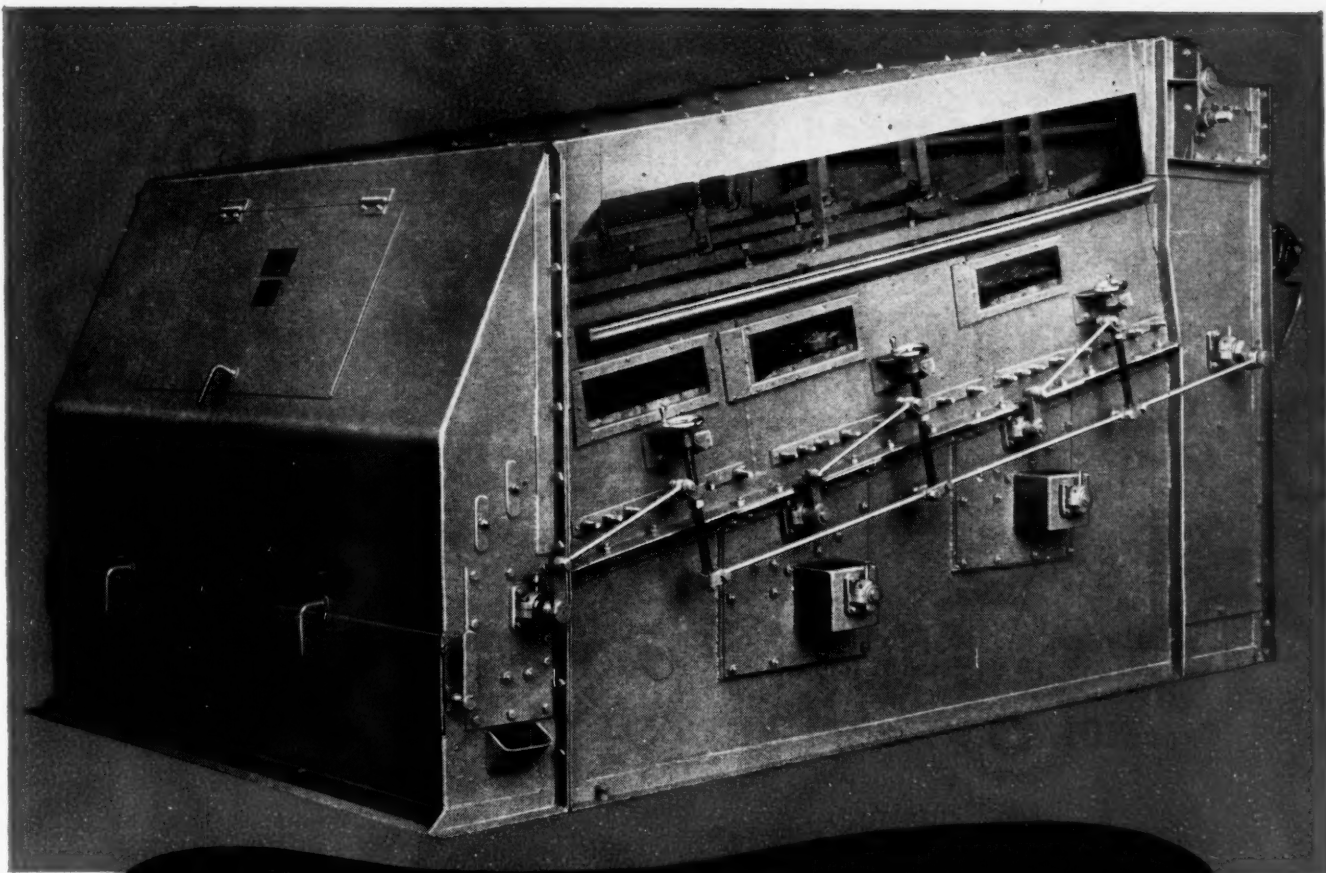


# GATES VULCO ROPE DRIVES

Engineering Offices  
and Jobber Stocks

**IN ALL INDUSTRIAL CENTERS**

of the U. S. and  
71 Foreign Countries



## MAXIMUM COAL CLEANING...

*per dollar invested*

Island Creek Coal Co., Holden, W. Va. prepares coal from five mines with Stump Air-Flow Cleaners. 15 units are in operation. A typical flow sheet at Mine No. 16 includes R & S Hydro-Separators for coarse coal washing and R & S Air-Flow equipment for fine coal dry cleaning.

R & S Stump Air-Flow Cleaner, for dry cleaning of your coal when desirable, is low in first cost, low in maintenance and high in capacity. The Air-Flow Cleaner occupies a minimum of floor space and needs little attention, yet it cleans up to 100 tons of coal per hour, depending upon the size and cleaning characteristics of the coal and the width of box used.

For maximum coal cleaning per dollar invested get full information about the R & S Stump Air-Flow Cleaner—Bulletin No. 163.

Coarse coal can be prepared economically in the popular R & S Hydro-Separators. Ask for Bulletin No. 161.

The R & S Hydrotator for washing coal in finer sizes is another R & S engineering achievement. Described in Bulletin No. 162.



### ROBERTS and SCHAEFER CO.

307 North Michigan Avenue, Chicago  
2221 Oliver Building  
PITTSBURGH, 21, PA.

P. O. Box 570  
HUNTINGTON, W. VA.

# Through Passenger Service Designed to Meet INDUSTRY'S NEEDS



Here is a new passenger train service ideal for industrial executives making business trips between the East and West Coasts. This no-extra-fare service is 10 to 18 hours faster than previous service between Chicago-St. Louis and the West Coast terminals.

## Between NEW YORK-WASHINGTON, D. C. and LOS ANGELES-SAN FRANCISCO

• • • •

**From New York . . .** through sleeping-cars depart on the New York Central and the Pennsylvania railroads. On arrival at Chicago they are carried through to Los Angeles on the Transcon; to San Francisco on the Overland.

**From Washington, D. C. . . .** through sleeping-cars departing on the Pennsylvania are carried through from Chicago to Los Angeles on the Transcon—to San Francisco on the Pacific. Departing on the Baltimore and Ohio, sleeping-cars are carried through to San Francisco on the Pacific.

Similar service available eastbound from Los Angeles and San Francisco. No change of cars enroute in either direction.

## Between ST. LOUIS-KANSAS CITY-DENVER and PACIFIC COAST

• • • •

Departing from St. Louis on the new Streamliner "CITY OF ST. LOUIS" through sleeping-cars are routed to Portland-San Francisco and Los Angeles (via Kansas City-Denver) with no change of cars enroute. Similar service is available eastbound from the West Coast.

• • • •

For complete information regarding schedules, accommodations and other passenger service to or from the Union Pacific West, inquire at your local ticket office.

**TO VACATIONISTS . . .** Union Pacific serves more western scenic regions than any other railroad. These include California, Pacific Northwest, Colorado, Yellowstone and the National Parks of Southern Utah-Arizona.



be Specific -  
say "Union Pacific"

**UNION PACIFIC RAILROAD**  
*ROAD OF THE Streamliners AND THE Challengers*

# Special Announcement

## NEW TIREX JACKET



All TIREX Cords and Cables are now protected by a new Simplex neoprene jacket fortified by the addition of Selenium. This new "Selenium Neoprene Armor" means greater savings for you because the new TIREX is:

### **OIL RESISTANT**

No deterioration of the jacket due to oils or greases.

### **FLAME RESISTANT**

Greater safety for your operations. TIREX will easily pass the Underwriters' horizontal flame test.

### **LIGHT RESISTANT**

Will not crack or check because of sunlight.

### **MORE WEAR RESISTANT**

Long famous for its extremely desirable wearing qualities, TIREX today is more wear resistant than ever before.

All of these advantages come to you without an increase in price.

All of our stocks and those of our distributors are this new TIREX and are marked "Neoprene".

This important change in TIREX construction was made so that TIREX Cords and Cables can continue to bring you the greatest possible service with the lowest cost per hour of operation.

*Simplex* **-WIRES & CABLES**

**SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.**

## COMBUSTION EFFICIENCY

# Correct Fuel Distribution in Firebox Cuts Boiler's Coal Need 15%

PATENTED, PRECISION INSTRUMENT  
INSTANTLY ANALYZES COMBUSTION GASES

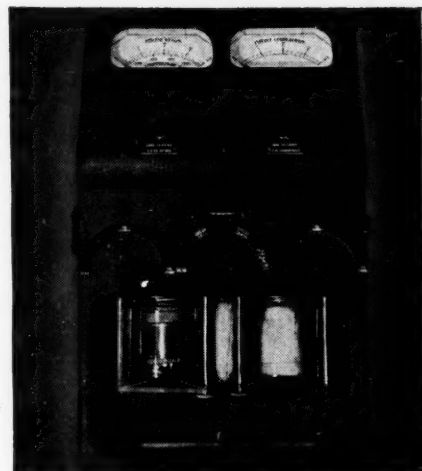
"A check on a boiler in a customer's\* plant at Niles, Michigan, demonstrated how the Cities Service Lubrication Engineer's Report Heat Prover shows the fuel saving possible when the boiler is operating efficiently.

"On most under-feed stokers, there is greater depth of burning coal over the retort—leaving the sides and end of the grates with a thin layer of coal. This thin layer of hot coal soon burns through in spots leaving holes in the

fire so that the grates are not covered entirely with coal. These bare spots on the grates allow the air to circulate through the firebox without coming in contact with the burning coal, thus increasing the stack temperature with attendant loss of combustion efficiency.

**Grates  
Evenly  
Covered**

"At intervals of thirty minutes, we took a poker, pushed the hot coal from the center, covering the holes and edges of the firebox with coal so that every part of

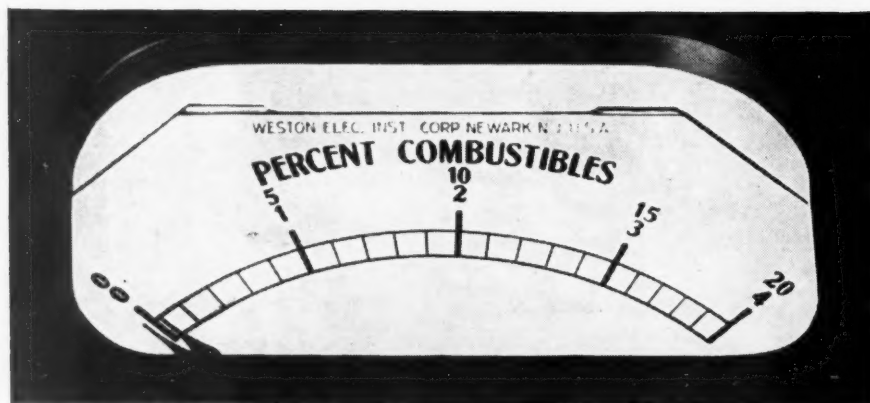
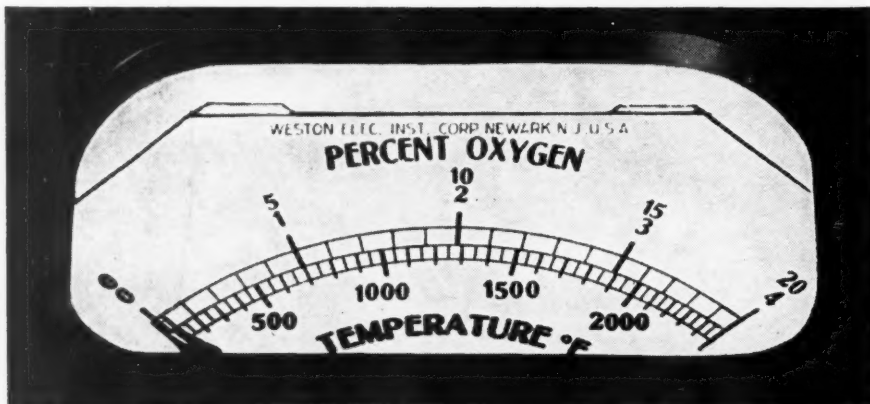


the grates was covered. This registered highest efficiency on the Heat Prover dials.

"This boiler was using 18,000 pounds of coal a day and by covering the holes in the fire every thirty minutes, daily consumption was reduced 3,000 pounds a day or a saving of about 15% to 17%."

The Heat Prover is a portable combustion gas analyzer patented by Cities Service and operated by trained Cities Service engineers. It is used to check efficiency of every type of fuel combustion equipment. For information call your nearest Cities Service branch office, (Arkansas Fuel Oil Co., in the South); or write to Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

\*Name on request.



*These dials on the compact portable Heat Prover instantly register an analysis of flue gases.*



FOR EVERY  
LUBRICATION PROBLEM  
CALL **Cities Service**  
**FIRST!**

# These 2 Exclusive Features Make

## DU PONT ELECTRIC BLASTING CAPS

### Safer...

—1—  
NYLON  
INSULATED  
WIRES

—2—  
RUBBER  
PLUG  
CLOSURES

The possibilities of dangerous and costly misfires are cut to a minimum when Du Pont Instantaneous and Delay Electric Blasting Caps are used. Two exclusive features—Nylon-insulated Wires and Rubber Plug Closures—provide added safety measures.

Check the advantages of these features:

**LESS CURRENT LEAKAGE**—tough, nylon-insulated wires resist abrasion; are equal to enamel in preventing current leakage.

**INSULATION READILY REMOVED**—nylon-plastic insulation can be easily removed when making connections.

**UNAFFECTED BY TEMPERATURE CHANGES**—sudden changes in temperature have no effect on the nylon-plastic insulation.

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**MAXIMUM WATER RESISTANCE**—double-crimped rubber plug closures provide maximum water resistance . . . are unaffected by extreme temperatures.

**EASIER, SAFER, PRIMING**—rubber plug closures permit using cap shells from  $\frac{1}{2}$ " to  $1\frac{5}{8}$ " shorter. Explosive strength is the same as old-type caps.

Ask your Du Pont Explosives Representative to show you Du Pont Electric Blasting Caps. Use them! *And remember—the most dependable detonator is the safest detonator.*

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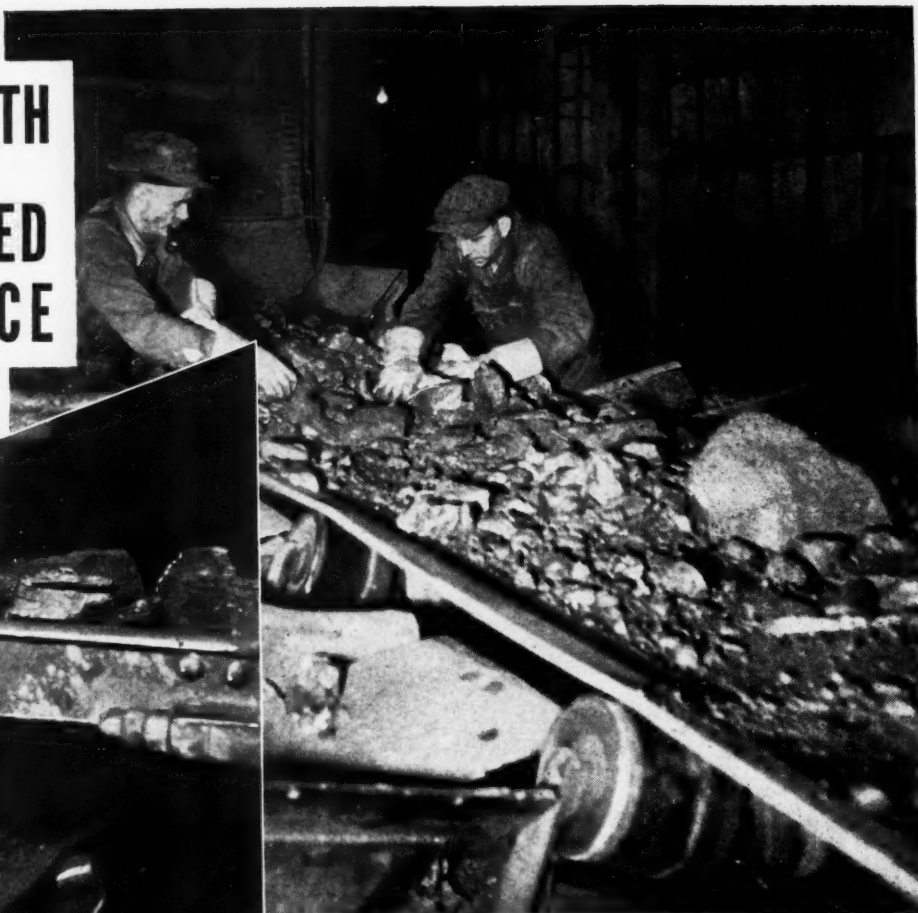
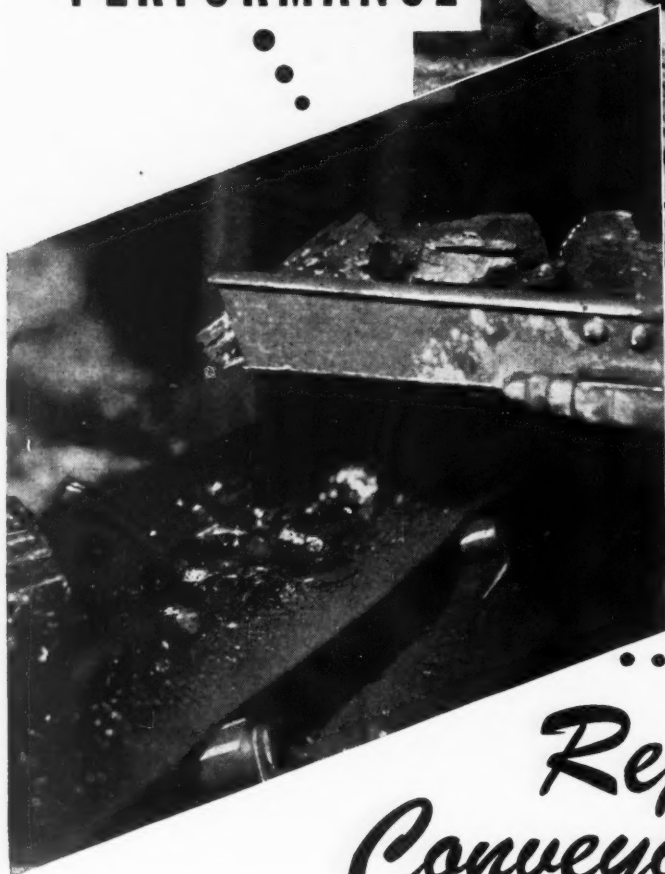
BLASTING SUPPLIES AND ACCESSORIES

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the new, improved  
Du Pont Electric  
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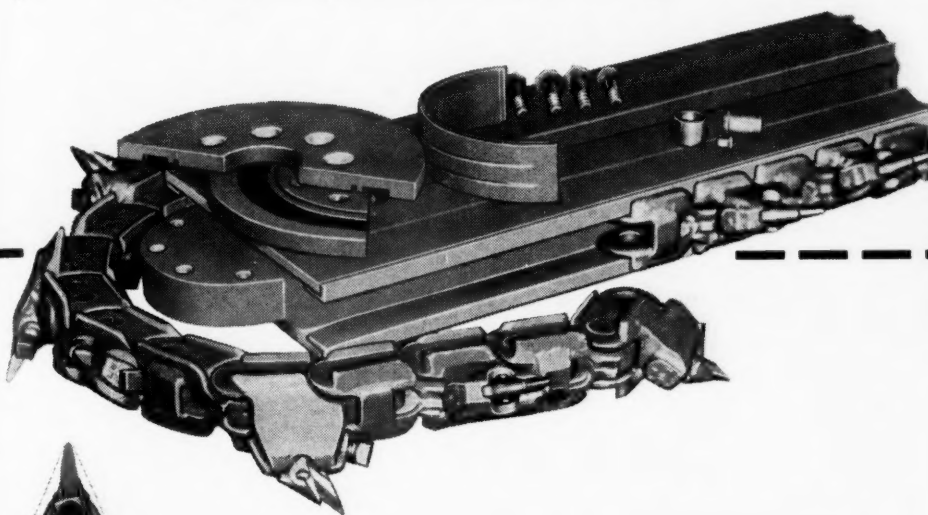


- 1. Eliminates Damaged Guides and Wearing Strips.** Bowdil's true-running radial track guide makes the chain circle the head at the correct angle. Smooth, wobble-free run prevents damage to guide or wearing strips.
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coal mining equipment... **THE**

## Bowdil concave cutter bits give 15% to 20% longer life

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## FABRI-FORGED cutter bars give longer service, produce more coarse cuts, save power

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**AUGERS AND DRILL BITS** specially heat treated, give longer service . . . eliminate grabbing.

**SPROCKETS** of long-wearing, tough alloy steel specially heat-treated for hard service. Sprockets in stock for all popular makes of machines.

**AUGER BITS.** Tough, long-wearing. Fish tail, four point and two point clay bits.

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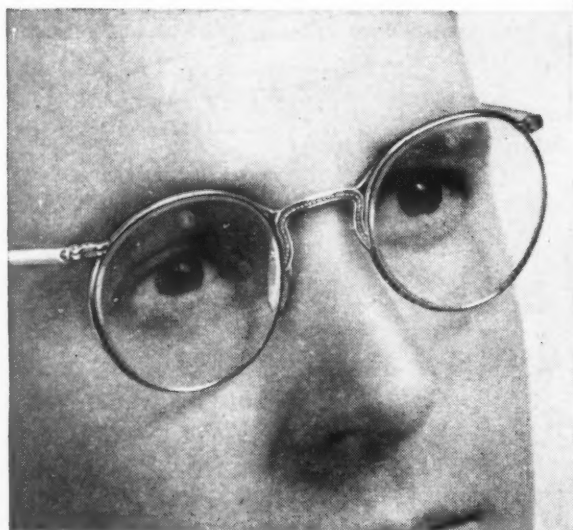
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*A-O Safety Goggles  
Safeguard the Eyes  
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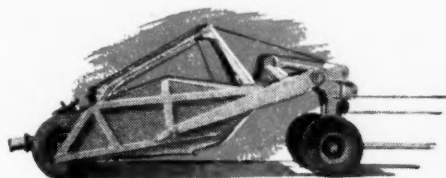
*The trend  
is to -*

## GAR WOOD ROAD MACHINERY

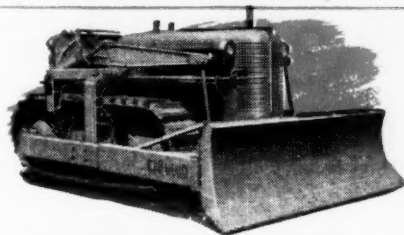
WITH ALLIS-CHALMERS DIESEL POWER

SALES VOLUME

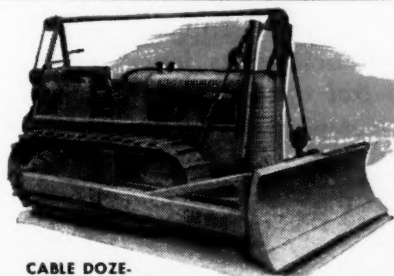
1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946



**4-WHEEL CABLE SCRAPERS**  
Capacities: 11-15-20-25 cu. yds.



**HYDRAULIC DOZECASTERS** with angling blades, for all Allis-Chalmers Tractors



**CABLE DOZE-CASTERS** with angling blades, for Allis-Chalmers HD-10, HD-14 and HD-14C Tractors

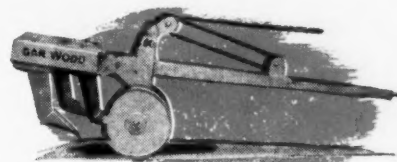


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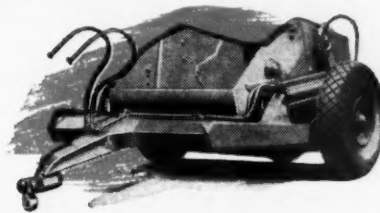
As a result, the demand for this equipment has steadily grown over a period of many years (see chart above) until now it has reached the proportions of a world-wide trend.

Here is a sound reason for specifying Gar Wood earth moving units. "Nothing succeeds like success."

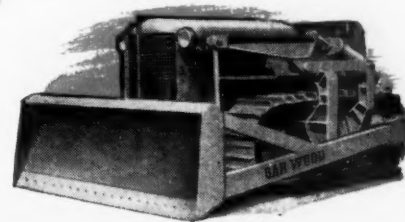
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Cable and hydraulically operated



**2-WHEEL HYDRAULIC SCRAPERS**  
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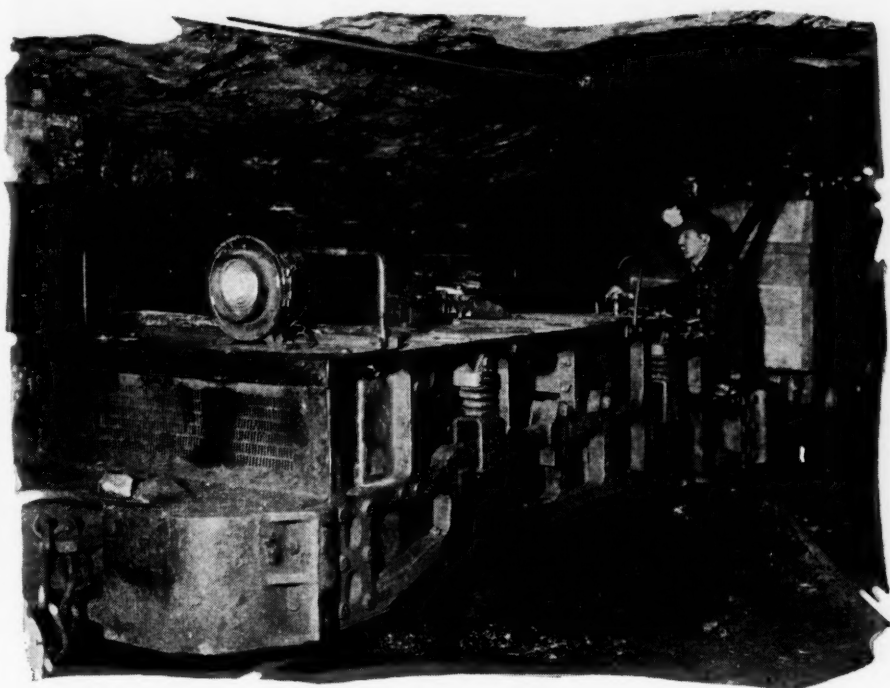
Give it the "third degree" — compare — and you'll see why Buckeyes are going into so many open pit coal fields.

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Yes ... more and more mining engineers are discovering that Tycol #19 Grease provides peak performance no matter what the atmospheric conditions ... for this new lubricant is scientifically compounded to assure maximum results down to 0° F. — and lower.

For full details concerning the benefits of Tycol #19 Grease, contact your nearest Tide Water Associated office today.

**LUBRICATION—"ENGINEERED TO FIT THE JOB"**

COAL AGE • July, 1946

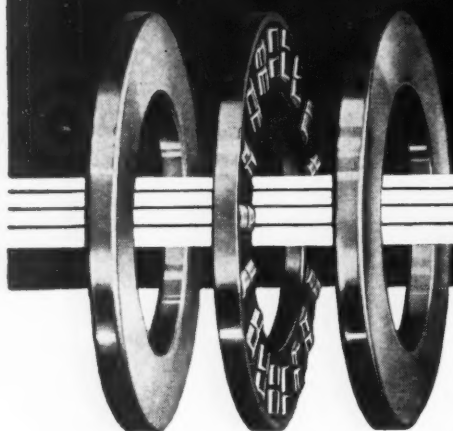


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when Bearings are Loaded  
the **ROLLWAY**  
RIGHT-ANGLE WAY



**Y**OU CAN'T engineer friction and stress out of your machines. But you can isolate them, you can control them better. Thus you can achieve

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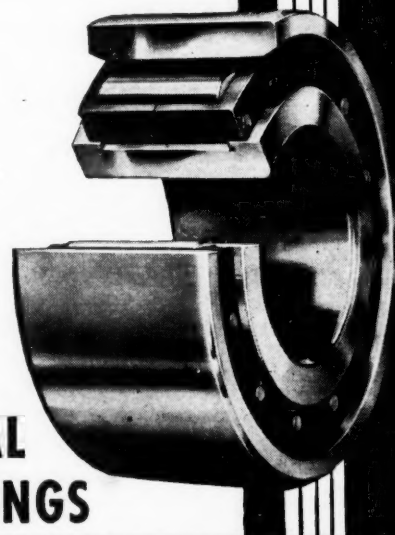


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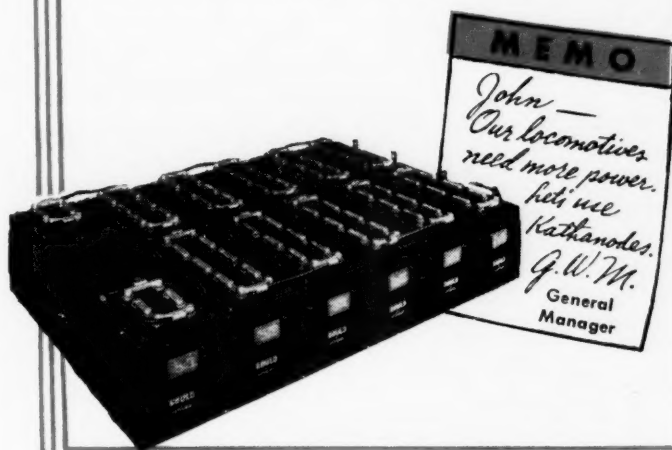
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## GOULD KATHANODE BATTERIES *Deliver More Peak Voltage*

Kathanode equipped mine locomotives have the punch necessary to meet all operating conditions. There is power for starting heavily loaded trains, and sustained voltage for fast runs even on grades.

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*"The World's Most Complete Line of  
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# For TOP EFFICIENCY--

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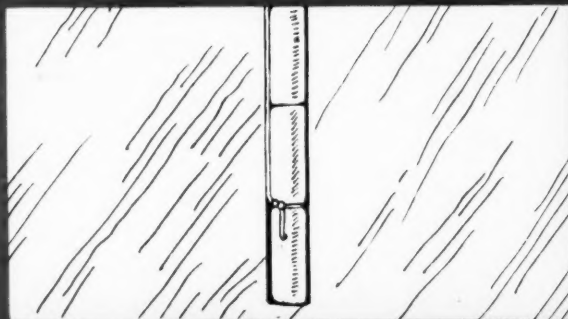
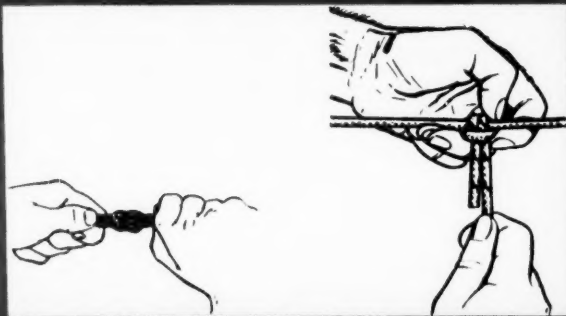
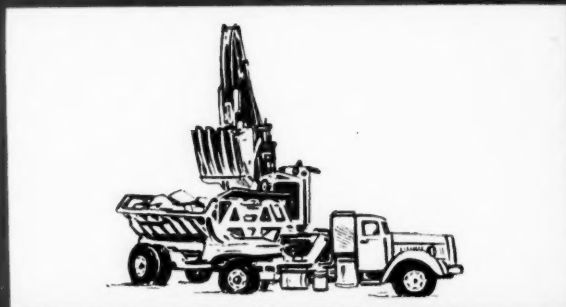
Whether you're shooting light or heavy overburden, really successful stripping and low shovel maintenance call for thorough fragmentation. In your pit you can be sure that well-planned Primacord shots will handle this job for you...

**With Less Hazard . . .** There's no chance of stray currents causing a premature blast when you use Primacord. The initiating cap is attached to the end of the trunk line just before the blast, and since Primacord is insensitive to ordinary shock or friction the danger of premature shots is minimized.

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## PRIMACORD-BICKFORD

### *Detonating* FUSE





JULY, 1946

Ivan A. Given, EDITOR

## Up or Down?

WHILE IT still will be some time before the full effects of the blow struck the coal industry by Lewis and Krug will be felt, it is perhaps not too early to take a look at the situation and some of its possible effects. Outstanding among the latter is the impetus given competition, not only by the increase in coal cost but also by the interruptions in service growing out of Lewis' determination to win victories on his own terms regardless of their effect on the future position of the industry and its employees.

Equally outstanding is the new invasion of managerial functions, which reveals even more clearly federal attitude toward business and industry. Coal-mining management—not Lewis and not federal officials—found the money to open the mines and install the modern equipment that means lower costs, higher quality and, consequently, more jobs for miners. Yet federal officials, in line with the New Deal policy of hamstringing business whenever and wherever possible, not only have attempted to curtail managerial rights in favor of Lewis but have gone on to assure him that management will be disciplined if it does not dance to his tune. One is irresistibly reminded of events in other countries, such as Great Britain and, particularly, France, where, just before the war, the Blum government, in combination with labor leaders, dealt coal and other industries a blow from which they never recovered—a blow partly responsible for France's inability to meet the German attack when it came. When government partiality enables one group to "feather-bed" at the expense of all others, experience has proved over and over that the general welfare suffers.

Coal will have to be mined because the country cannot do without it. That alone should assure good business—although not necessarily profitable prices when federal officials have done their work—for at least a year or two more. But the increased costs imposed on the industry by Lewis and Krug, plus the production interruptions that have kept the users of coal in a lather since the war started, favor a competitive upsurge that can cost coal a great deal of business and miners a great deal

of earnings unless prompt steps are taken in the direction of less interference with management, fewer production stoppages and higher efficiency. Coal is now definitely on the danger line—if not over it—and until it can pull back, the watchwords must be not "feather-bedding" and power for Lewis but rather steady work, no production stoppages and higher efficiency. In spite of the harrying it has received from Lewis and federal officials, coal-mine management still is willing to make the investment in "know-how" and equipment necessary to offset even this latest and heaviest blow. This, plus keener merchandising and more penetrating research, can still turn the trick. Lewis and the New Deal have made coal's row a lot harder to hoe. However, the job still is not impossible, although a lot more difficult, and progress now will count even more heavily in coal's favor when, as now appears more hopeful, the federal government returns to sanity in labor relations.

## Real Assets

IN ACCOUNTING parlance, "assets" include lands, buildings, fixtures, machinery, and other things on which a book value can be placed. With all these, however, the company still cannot earn a profit; it needs customers first. Therefore, the real assets of a business are the people who buy its product. In this sense, coal's assets have been taking a beating lately, thanks to Lewis and the New Deal. Some users have been lost; more will be. How many more depends upon a lot of things, cost being one. But cost, vital though it is, isn't everything. Convenience and service seem to be other big factors persuading users to turn to other fuels.

Convenience is a function of the form in which consumers get their fuel and the equipment in which they burn it. Service means readiness to help a user 24 hours a day. Both are major ingredients in good merchandising, along with courteous, efficient and helpful selling. Better merchandising is one of the big jobs ahead for coal. For the service reason alone, the new marketing plan of the National Coal Association deserves unanimous industry support. Anything coal can do individually or as a group to promote satisfaction with its product retains and adds to its customers—its real assets.

# COAL CHARTER: Industry's Next Job?

To provide the foundation for further work in building public good will, to promote progress through joint effort and to forestall further raids by union and government officials, an industry conference to draw up a charter for coal and set up an organization to promote fullest adoption of its principles has been proposed. In the following pages, *Coal Age* presents the thinking of the operators on the need for such a conference and on some of the topics it might act on.

By **IVAN A. GIVEN**  
Editor, *Coal Age*

WHAT EFFECT the Lewis-Krug agreement, with its disciplinary and other provisions invading the field of management and unnecessarily raising the price of coal, will have on production and employment was yet to be measured fully at the time this was written. Evidence, nevertheless, was mounting that unless management is permitted a chance to cultivate consumer good will and increase efficiency, coal and coal miners are in for substantial losses to competition. In fact, the effects already are being felt in those sections of the country a little closer than others to oil and gas. Even elsewhere, it is apparent that coal's breathing space is at best probably no more than two years, assuming no further eruptions by Lewis and his federal henchmen.

Will coal get that breathing space—space in which to take what steps it can to mitigate the effects of the blow it has been struck? There is no assurance that it will. If, as the language of the contract seems to indicate, Lewis and Krug are going to hold onto the mines while they tinker with the industry and make it over to their own

ideas, there will be no breathing space in the near future. If it should develop that the government wants to return the properties without delay, but Lewis refuses to permit it without further exactions, or if he signs now and next spring goes on another rampage and is again helped by federal authorities, coal's chances of lightening the burdens already inflicted on it likewise will be considerably reduced.

If it is assumed, however, that Lewis and Krug let loose without further damage being done, what about the future? Will a temporary respite be followed by further, more severe blows? That is the problem facing the coal industry—that and developing a program and a plan of action calculated to reduce the chances of similar calamities in the future.

It must be conceded that as long as labor leaders striving for more power and federal officials dedicated to hamstringing industry and arrogating to themselves more and more authority over the freedoms of the individual continue their unholy alliance, it will be difficult to prevent further progress down the road to statism. A change in public and congressional sentiment is the key. Recent events indicate that there is a trend toward a new attitude in these quarters. If this trend can be

strengthened by steps toward even more progressive industry policies, the return to sanity will be that much faster.

The foregoing is not to imply that industry has not progressed. It has—decidedly. But the fact remains that the government-labor-leader alliance and tactics were made possible only because the public has been sold on the idea that management needed some medicine and that labor leaders and government officials were the boys to administer it. It is not difficult to see that philosophy at work in the present seizure. However, there is some reason to believe that the public is getting the idea that it has been sold a bill of goods and that labor leaders are not necessarily humanitarians interested solely in the welfare of their members and the public. That suspicion, however, must grow into certainty before real reform can be achieved and a major task of management is to till the soil and water the plant until it grows to maturity.

Coal mining has suffered particularly because of adverse public opinion. It has spent millions of dollars and devoted major effort to improving its service to the public and making the industry a better place to work. But Lewis and federal officials trade on the premise that taking the axe to coal min-



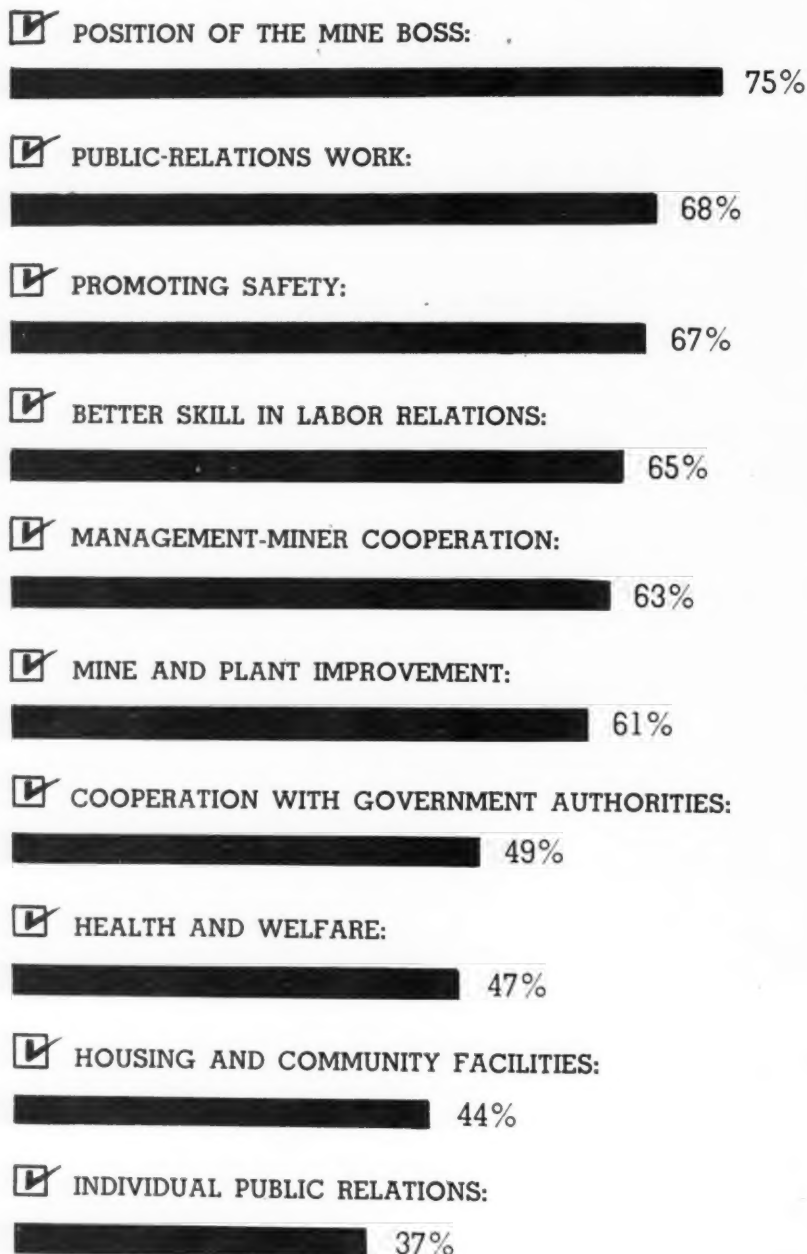
## THE MINE WORKER—CRITICAL FACTOR IN COAL

Although one of the highest-paid workers in industry and the beneficiary of large expenditures to improve his working and living conditions, coal has suffered because he and the public still have the impression he isn't getting a fair shake from management. To help correct that impression, on which union leaders and government

officials trade, and to help make him a full partner in safe, efficient operation, coal presidents agree that a charter laying down the fundamentals of progressive industry policy, supplemented by an organization to put it into effect, should lead to better service to the consumer and better returns to both man and management.

## KEY COAL SUBJECTS

How coal-company presidents rate ten topics as to their importance in a conference to develop an industry charter and an organization to carry out its provisions.



Also suggested by presidents: competition, overcoming miner hostility and suspicion, the future of the industry, \$100 bonus and portal-to-portal, cost and price, differentiation between large and small operator, more skill in contract negotiations, stripping, legislation similar to that applying to freight rates and State laws defining the safety responsibility of the miner.

ing will bring no outcry from the public—at least to date—because they feel that the public will at least condone, if not actively support, their actions. As stated, that situation shows signs of changing, with the industry's public-relations program as no small factor, but so far the boys feel confident that they can get away with whatever they want to attempt.

The reasons are general and particular. Generally, they reflect the trend in public thinking that made possible the spread of federal authority and the upsurge of unionism. Regardless of the fact that it was rooted largely in propaganda, the trend developed and had its effect. Particularly, the reasons for adverse feeling against coal arose out of the fact that until the industry began to make the truth known the public was unaware of the facts about coal-mining accomplishments.

### Additional Step Needed

Public-relations work should be continued, strengthened and expanded. But the trend of the times indicates that something further may be needed—something above and beyond continuation of individual efforts to make the coal industry an even better industry to trade with and work in. Labor-leader wings may be clipped and federal officials limited to operating according to statutes on the books, but the public will continue to expect industry to do certain things. The things it expects are the same things management accepts as essential to progress—a good product at a low cost and a relationship between management and employees that insures good working conditions, a fair share of the benefits of joint effort for the worker and a fair return to the investors.

Coal has made major progress in this direction because it is convinced that it is the right direction. But it has proceeded on the basis of general understanding and not by any written charter, supplemented by an organization to secure prompter, wider-spread adherence to it. Consequently, it has to face up to Lewis and to his federal henchman without a program in black-and-white and formal evidence that it is being carried out—and suffers accordingly when it is unable to point to a platform and a plan of action for putting its provisions into effect.

Logic dictates that coal mining take active steps to get off the spot in this respect. Logic dictates that it should develop its own charter for progress and an organization for carrying out its provisions. Such a step would reflect in tangible fashion coal's determination to progress with its employees and would

refute unfair and self-seeking attacks on the industry, in addition to providing machinery for more quickly adopting new and desirable practices and speeding their acceptance.

It was with this thought in mind that *Coal Age* suggested in its June issue a conference to develop a program, platform or charter and a plan for putting it in action as an industry, rather than an individual policy. It was with this thought in mind that *Coal Age* asked coal-company presidents for their ideas on holding such a conference and on topics which might be considered for the adoption of standards at such a meeting.

### Company Presidents Favor Plan

Coal-company presidents replying were more than eight to one in favor of such a conference, with most of those on the opposition side not against the idea but against it until the mines are returned and coal has a little chance to get its bearings again. Several presidents made the pertinent comment that the industry organizations, such as the National Coal Association and Anthracite Industries, Inc., should lead in holding meetings to plan for the future.

In asking coal-company presidents for their ideas as to topics on which the conference might act, *Coal Age* suggested ten, as follows:

1. Promoting safety.
2. Housing and community facilities.
3. Health and welfare.
4. Mine and plant improvements to make working conditions more attractive.
5. Joint management-miner procedure to promote efficiency and safety and speed other improvements.
6. The position of the mine boss.
7. Better skill in labor relations.
8. Cooperation with community, state and federal authorities on improvements.
9. Expansion and strengthening of public-relations work.
10. Individual participation in public relations.

A number of operators checked all items. The combined vote, however, found 75 percent of the presidents replying concerned with the position of the mine boss. Next in interest with 68 percent was expansion and strengthening of public-relations work as an industry project, with 37 percent seeing more individual work in public relations as a vital question. Promoting safety was a major matter to 67 percent; better skill in labor relations, 65 percent; joint management-miner procedure to promote efficiency and safety and speed other improvements, 63 percent; mine

and plant improvements to make working conditions more attractive, 61 percent; cooperation with community, state and federal authorities on improvements, 49 percent; health and welfare, 47 percent; and housing and community facilities, 44 percent.

Other topics suggested by presidents replying included competition of other fuels, overcoming the hostility and suspicion of miners as a result of the teachings of Lewis, the future of the industry, the \$100 bonus to miners, portal-to-portal, cost and price, differentiation in regulations and treatment between the large and the small operator, more skill in contract negotiations, stripping questions, legislation similar to that now applying to freight rates and State laws defining the worker's responsibility in safe mining.

Comment by presidents bolsters the conclusion to be drawn from the vote on the suggested topics—that coal-mine management is aware of its responsibilities and is eager to discharge them if Lewis and federal authorities will give it a chance. It is also evident that by and large the industry still is planning to go ahead, although a small number are not too optimistic. "With John L. Lewis and our rotten political set-up," one president remarks, "we wouldn't have a Chinaman's chance of putting any program of our own through." Says another: "The intelligence of the coal operator has been so completely discredited by the government that I think our efforts in either helping or hindering are wasted. . . . Ultimately, between the union and the government's dishonesty, we will no longer be able to produce at a profit and we'll dismantle and call it a day. The coal industry isn't the first golden-egg goose to be sacrificed."

### Competition a Vital Factor

Competition was the theme running through a number of comments. Said one operator: "I have some misgivings about the industry under the new contract which I agree with you is burdensome. Even though the operators may be able to obtain what they think is a satisfactory price to offset the wage increase, price alone is not the answer to our problem. The industry today is enjoying a seller's market, due very largely to the fact that for the last five years this country has not produced the goods that the domestic consumers may desire, but some place along the line we are going to catch up with this demand and then the real difficulty, in my opinion, will present itself. We can get the price of things too high. Coal is not an exception to this rule because, from the study I have made the last eight or

ten months, I find that coal is being replaced by other forms of energy to a much greater extent, in my opinion, than the operators and the mine workers alike realize."

Urging as one topic "increases in the price of fuel oil and natural gas," one president pointed out that "competitive fuels are now being held to depression prices by OPA." The increased cost of coal, he continued, "is driving thousands of consumers to the use of oil and natural gas. The government has conceded wage increases that will increase the cost of coal mined in the Southwest from 80c. to \$1 per ton and is at the same time refusing to allow the oil industry to increase the prices of fuel oil above the low prices in effect at the beginning of the war. This is not protecting the welfare of the coal miners. It means short running time, smaller annual earnings, decreased purchasing power and still higher coal costs and prices to the public. Government and U.M.W.A. policy is harming coal and driving thousands to the installation of oil and gas burners. Once lost, these customers will never be recovered. OPA should at once advance the prices of competitive fuels or release them so that prices can equalize."

### Small Operator Handicapped

The relative positions of small and large producers brought forth statements such as this: "We believe there should be some difference in prices and regulations between the large operator and the small operator. If such is not considered, many small businesses will be forced to close." Said another: "I believe that the last several agreements with the U.M.W.A. took into consideration only the viewpoints and ability to pay of the large operators. Seems to me like a freeze-out for the small operator."

Several presidents supplied pithy comments on safety. One characterized the laws of his State as the best in the country and federal inspection as a farce. Another, stressing the necessity of discussing safety from the standpoints of both the company and the employee, had this to say: "State laws should be sought making it mandatory to prosecute workers for wilful and repeated violations of safety rules and warnings. If they really want to be safe, for God's sake let's make it that way and make them like it."

More specifically on the conference suggested by *Coal Age* some operators had decided opinions on how it should be conducted. The agenda, said one, should be simple and the fundamental topics adhered to. One, doubting its accomplishments, opined that "people can better analyze their own difficulties

## NEXT STEP FOR COAL?

### SITUATION:

Government-imposed contract sets up new conditions and poses new problems coal must meet.

Coal has made major progress in improving its operations but events have proved it suffers because it lacks a formal code of standards governing operation, safety, relations with employees and related matters, as well as a formal organization for speeding acceptance and making revisions as necessary.

The public, lacking a formal code and an organization for putting it into effect, is correspondingly slower to accept evidence of the industry's accomplishments, thus playing into the hands of Lewis and his government supporters.

### LOGICAL STEP:

Holding of an industry-wide conference to:

1. Reorient industry operations with the new conditions imposed by the government.

2. Develop a code of standards putting into concrete form its progressive policies for improvement of mining operations, safety and employee relations.

3. Set up an organization to make revisions as necessary and to promote speedy adoption of industry-approved policies.

and promote better remedies by giving individual thought to their problems in the quiet surroundings of their respective offices where their judgment is not disturbed." Another of the majority in favor of a meeting also was one of several wondering if it should be held while the government retained the properties. Concerning the suggested conference, he observed that "if the matter could be discussed fully by a representative group of operators, with a chairman who has the ability to carry the meeting on to a conclusion, I will join in such a meeting."

Consciousness of the need for getting the facts to the public was responsible for the heavy vote putting public relations in second place and for comments such as the following:

"For the past ten years we have been recommending that the coal industry carry on an aggressive and constructive public-relations program. We believe that this is the most important item on your proposed agenda. That subject is one that could be discussed by the entire conference. The other subjects, it seems to me, would have to be studied by subcommittees, with reports to another general conference later.

"The coal industry, in our opinion, has always been at a tremendous disadvantage when the time has arrived for collective bargaining with Mr. Lewis and his associates, because we have failed to keep the public informed with respect to the constructive work currently being done by the mine operators and of the high earnings of the miners and of the high voluntary absenteeism prevalent throughout the industry. The public must be currently informed. Otherwise, our denials of Mr. Lewis' outlandish statements will have little effect."

In advocating stronger public relations, another operator offered the following:

"In reply to your letter of June 7 containing the questionnaire with suggestions for an improved coal-industry program, we are heartily in favor of any program that will help improve public and labor relations.

"While I am certain that much attention and hard work were put into the planning of the public-relations program conducted during the negotiations for the United Mine Workers' 1946 contract, it is believed that a more comprehensive approach may now be nec-

essary to obtain public indorsement of the achievements and motives of coal operators. We in the industry know that the majority of operators are utilizing their best efforts to promote the health, welfare and safety of miners. Even if those who differ may not give operators credit for having a humanitarian interest, certainly they will agree that operating costs will be reduced and output and profits increased if high standards are established for miners, and so on. From an enlightened profit motive, the miners' welfare interests are certainly the operators' also. Only a distorted opinion can result from propaganda that implies that for years the unions have been struggling for better safety conditions and that the operators have either been negligent or unenthusiastic about the acceptance of safety programs. Yet such opinions are now more or less prevalent in the public mind outside the coal regions. To counteract such opinions and present the facts a comprehensive public-relations program is required.

"You have suggested the first important step in such a program. That is for the industry to get together and determine methods for improving con-

ditions. It has been proved many times that the only publicity of lasting value must be based on fact and result from effective, constructive action. Therefore, every effort must be made by the industry to improve conditions so that favorable publicity will automatically result.

"Secondly, upon the development of a constructive program it will then be necessary to 'take the light from under the bushel' and publicize what has been done. By this I do not mean that the newspapers and magazines should be flooded with publicity releases. It is far more important to have the right people know the facts. Only in this way can public opinion be effectively molded.

"The enormity of the public-relations job should be emphasized. It is certainly not one for a single publicity man or organization. It will require the efforts of the entire industry. However, it is believed that the services of one of the top public-relations firms in the country would be of inestimable value in planning such a program. Because there is a vast difference between publicity organizations and public-relations concerns, I would like to emphasize the importance of engaging a concern equipped to handle a program of this magnitude more from the planning than just the publicity standpoint. This presents an opportunity for the coal industry to regain goodwill that may have been lost and which is essential to its further progress—if not to its survival as a prosperous industry."

### Forethought Advocated

With other considerations, greater skill in negotiating and more concentration on forecasting possible events and taking steps to forestall blows such as the latest one struck at the industry, were seen as necessities by several operators. While "it is true we are dealing with a despot in John L. Lewis and socialism in our federal government, to say nothing of extreme ignorance of the mining industry by those who have taken the industry out of the hands of the operators and give no regard whatsoever to the economics and the future of the industry," one operator felt that it should have been possible to "foresee the proposed action on the part of the government and make some effort to salvage as much as possible of our individualism."

To review the coal situation, several factors are apparent:

1. Coal is aware of its responsibilities and is discharging them, individually, in able fashion—witness the heavy expenditures over the years for improving

efficiency, safety and working and living conditions. If nothing else, the steady improvement in the safety record of the industry is evidence that coal is progressing.

2. Despite this record, Lewis and his federal henchmen still are able to take the ax to coal mining at will because the public still is under the impression that management is laggard in accepting its responsibilities.

Since No. 1 conclusion should cancel No. 2, it would seem that there is a step yet to be taken. Coal has started to take that step through its public-relations program, and the results already are becoming apparent, although the job still is a long way from being completed in view of recent happenings. What can be done to help the work along and speed acceptance of the truth by the public and Congress?

The answer would seem to be that since the public expects industry to be forward-looking in its relations with it and with its employees, coal should, as an industry, go on record in black-and-white with its principles and program. It should supplement this charter with an organization to secure revisions as necessary and to promote putting its provisions into effect as quickly and as widely as possible, lending assistance to individual companies as far as it is within its power.

A charter and an organization to back it up has in its favor this first thing: it should insure wider and faster progress for the industry as a whole. It should crystalize sentiment in favor of the steps to make mining more efficient and attractive, now generally accepted by coal operators, and would supply additional incentive for putting them into effect quicker in the maximum number of properties. One result should be a more efficient industry because of the institution of desirable practices without delay—at the industry's instigation as an industry, thus forestalling the usual charges that progress results only from pressure from the outside.

Another advantage of such a step is this: plans and principles presented by an industry as the industry's are more likely to be accepted by the public than the plans and principles of individuals, no matter how numerous. Such plans and principles, ratified by the industry as a whole, are easier to sell to the public, especially when backed up by definite evidence that the industry has and is actively putting them into effect. They also, incidentally, are easier to sell to the miner who, in the last analysis, is the key figure. If the miner is thoroughly convinced that he is in an industry that is progressive and means business when it says his welfare, and

that of the public, are managements' No. 1 considerations, that opinion is bound to affect public attitude and, even, the tactics of union leadership and its federal supporters.

Development of a charter and an organization for putting it into effect is no small task. When the industry should take this second step, first preceded by some hard individual thought on its problems and methods of solving them, is somewhat of a question. There is evidence that a formal conference to get the work going, assuming that it is desirable as operator expressions indicate, should not be held until seizure is terminated and coal has a chance to get settled again. The time left, however, is short and everything indicates that the earlier the industry can take effective steps the better off it will be.

### Service the Key

Fundamentally, industry progress is rooted in improving service to the public. Concurrently, it has the responsibility of seeing that its employees get every consideration consistent with maximum service to the public. Since the New Deal made its alliance with union leaders, however, industry's difficulties in these two main directions have been multiplied. In fact, industry has been required to think first of union-leader and federal demands and put public service and employee welfare second—sometimes a poor second. The results are so plain as to need practically no comment—particularly in coal mining. Only when industry can turn back to basic considerations can public service and employee welfare again receive the attention they deserve from industry—and for which there is no substitute.

Coal has suffered damage from the latest program staged by Lewis and his federal catchpolls. But if it can secure a breathing space in which to take steps to offset some of the added burdens, it still has a good opportunity to continue to render a necessary service to the nation. By going on the offensive with its own program and its own organization for carrying it out, it has the opportunity of speeding desirable improvements and of securing more quickly the necessary employee and public favor on the strength of a concrete charter and evidence that it is being observed.

Cost, in money and in human effort, is a consideration. But if it purchases freedom from employee and public disfavor, harassment by self-seeking labor and government officials and interruptions in production, with consequent consumer reaction, the benefits should considerably outweigh the cost.

# SAFE SUPPORT

## Provided By Hitching and Steel Timbers

Direct Hitching and Steel for Timber Promote Safety and Cut Maintenance—Standard Beams Are Lighter With Equal Strength and Cost Less—Drill or Top Cutter May be Employed in Making Hitch Holes.

By J. V. McKENNA

Inspector, 13th Bituminous District  
Pennsylvania Department of Mines  
Waynesburg, Pa.

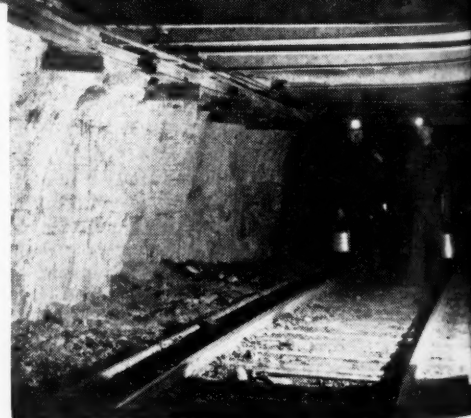
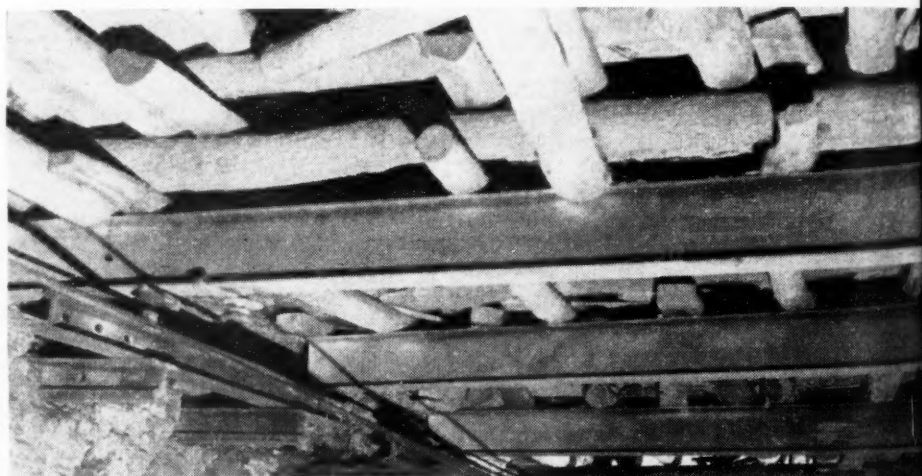
TO OBTAIN maximum safety and minimum maintenance costs many bituminous mines are adopting variations of hitch timbering with steel for permanent and long-lived temporary haulageways. Advantages claimed are permanent, safe protection for roadways at a substantial reduction in cost. Elimination of legs minimizes damage to timber sets caused by derailments, as well as frequent retimbering because of decay of legs and accidents resulting from improperly set posts.

There is nothing new about the hitch method of timbering, i.e., hitching the timbering directly into the rib or setting the supports on steel sections hitched in. This procedure, to the best of our knowledge, was followed more than 75 years ago. It is surprising that with all its advantages it has only recently shown evidence of gaining in popularity, because it can be applied economically and

universally with only the following limitations: (1) where roof structures are such that abnormal support is needed; (2) where double-track haulageways or previous operations require cross members of such width that posts or leg supports are required.

The Binkley Mining Co., Clinton, Ind., installed one of the first modern systems of direct-hitch timbering at its No. 8 Mine in 1929 (Coal Age, Decem-

ber, 1931). The No. 3 seam at this mine had a treacherous roof of which at least 1 ft. checked and fell shortly after the coal was taken. Falling continued indefinitely unless the rock was held by beams and lagging. Prior to the development of the hitch drill, the roof was held by rail beams on wood legs. Afterward, the management drilled two 8-in. holes in opposite ribs of a heading for the beam. A clearance of 6 ft. was pro-



Section of old haulway retimbered by the pin-and-stringer method. Photo made in 1938. Installation is still in service with no trouble and no maintenance.

Shearing both ribs and hitching crossbars makes a trouble-free long-lived haulway.

July, 1946 • COAL AGE

vided on main haulageways and 4 ft. 8 in. on panel headings.

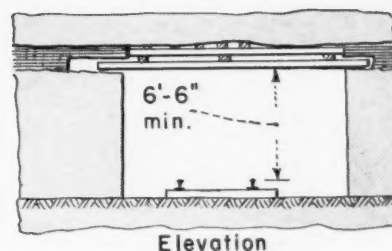
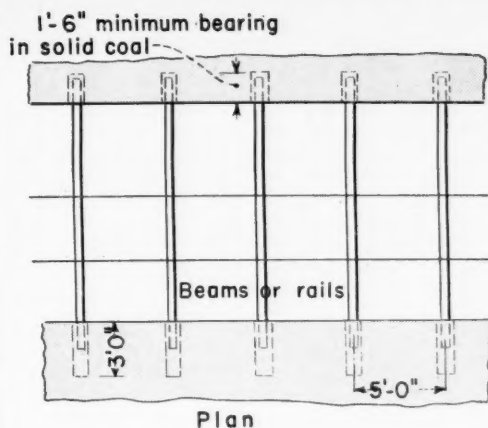
As the coal was about 5 ft. thick on the main headings, holes invariably were drilled in slate. One hole was drilled 18 in. deep and the opposite one 36 in., so that after the bar was installed the support given by each rib was 18 in. Rails weighing 90 lb. per yard were used as beams. They were shoved to the back of the deep hole and then pulled back to bottom in the short hole. The rails, on 4-ft. centers, were locked with pieces of split props and intervening zones were lagged.

Crossbars at breakthroughs were supported on a longitudinal beam running across these openings. Each end of these beams rested on pegs of 90-lb. rail sunk and cemented in a hole 5 ft. deep and projecting 1 ft. out from the rib.

### Special Drill Built

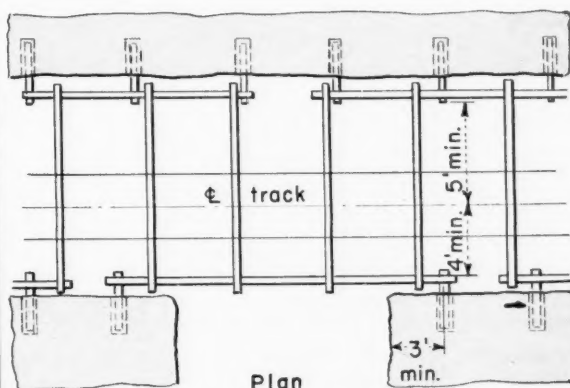
Holes were drilled with a machine built in the Binkley shop utilizing many parts from discarded equipment. Briefly, the machine consisted of a truck on mine-car wheels, fixed to their axles, which could be propelled from job to job by a 7-hp. motor operating through sprockets and chains. On long moves it was hauled by a locomotive. The drill was anchored to a turntable which revolved on a roller bearing about a kingpin. This pin held the table centered on a heavy baseplate which could be slid crosswise of the truck, adding to the reach of the drill. A 25-hp. motor from a breast machine, regulated by a controller from a locomotive, drove the drill through a sprocket chain. The drill was on the end of a boom, which was raised and lowered by a steel cable and a hand-operated worm-driven reel. With an average feed of 20 in. per minute and a threadbar with six teeth to the inch, the average speed of the drill was 120 r.p.m.

Both holes were drilled without changing the position of the truck or boom. After the first hole was drilled a drill steel was placed on the free end of the threadbar, rotation was reversed and the second hole started. No time was lost in feeding out or in swinging the drill 180 deg. Two workers manned the drill. One handled the controller and the second removed the cuttings from the hole. Though the roof was a hard gray shale, the machine drilled an 8-in. hole to a depth of 30 in. in 1½ min. (1 to 1½ min. were required to square-face the slate and start the pilot hole manually). Moving

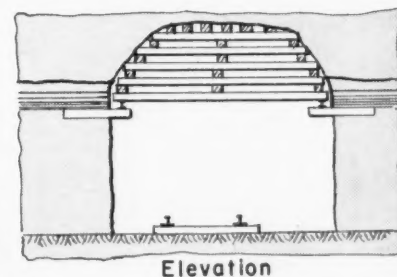


Where life of entry is more than five years, concrete beams or pins in place and use treated lagging.

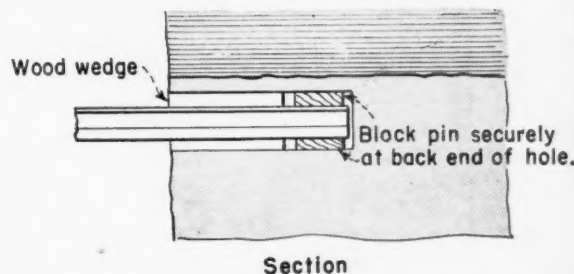
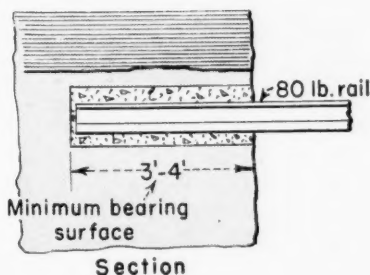
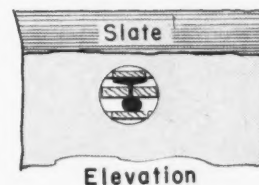
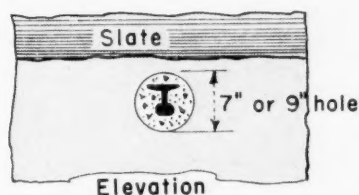
### CROSS-BAR METHOD



Where life of entry is less than five years, wedge beams or pins in place and use untreated lagging



### PIN-AND-STRINGER METHOD



### CONCRETING PINS

### WEDGING PINS

Fig. 1—Crossbar and pin-and-stringer methods employed by one mining operation for a number of years.

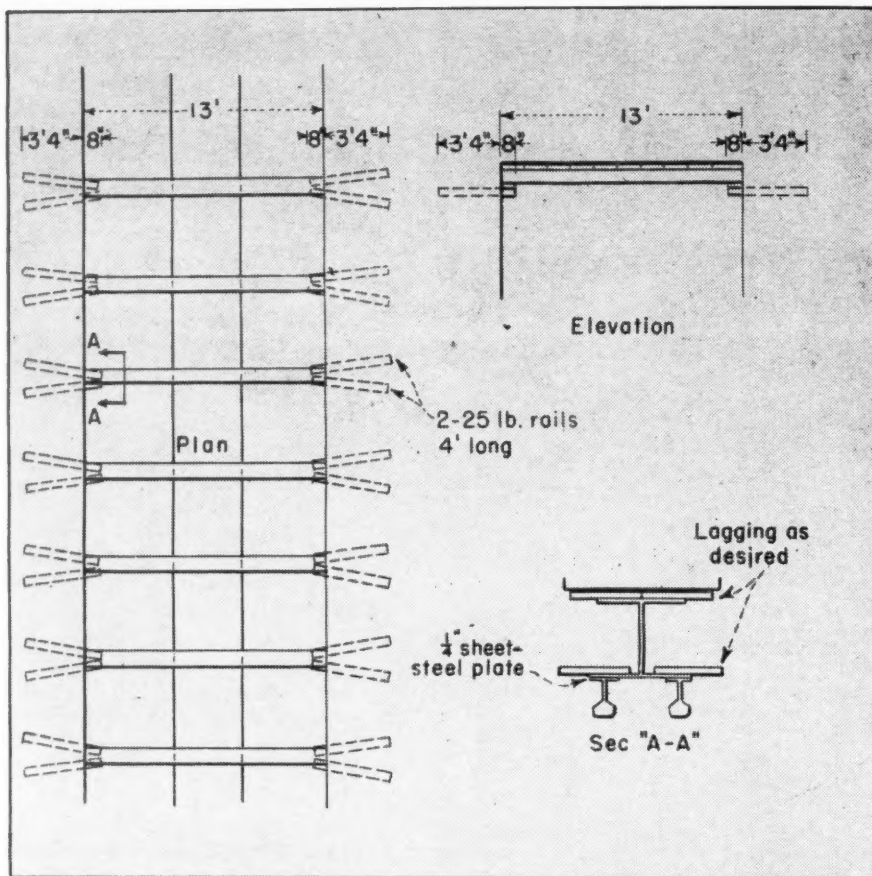


Fig. 2—Double-pin and plate support for steel crossbars.

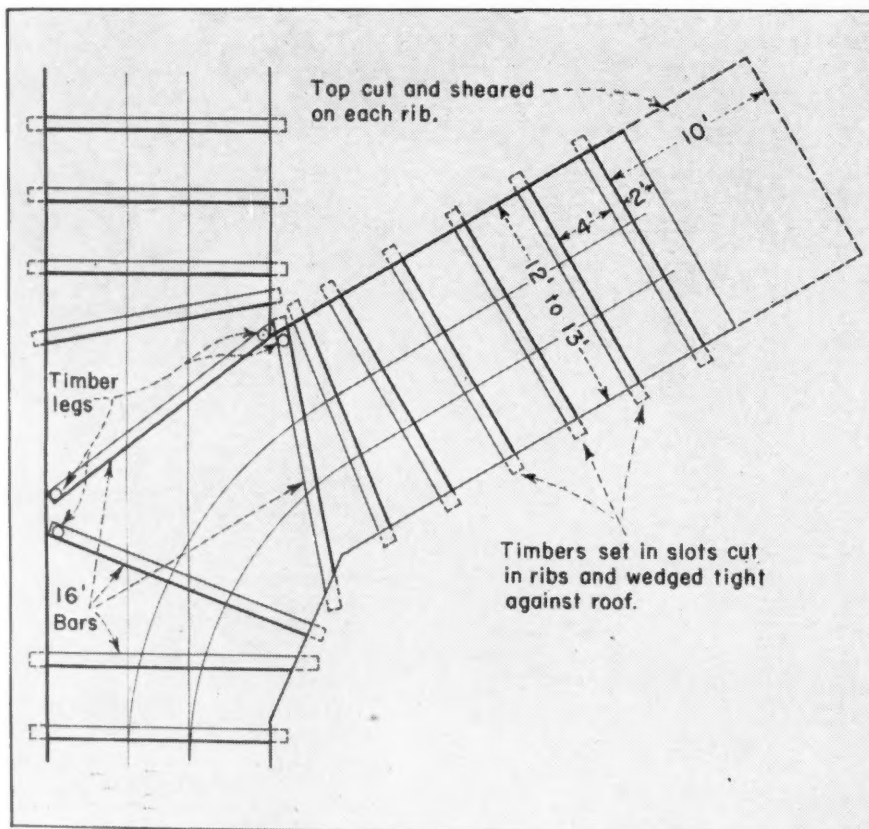


Fig. 3—Hitch timbering by slotting ribs with top cutter.

the machine 4 ft. and making ready to drill the next set of holes, including bit changes, took less than five minutes. The average number of rock holes drilled in eight hours was 46. It was stated that the drill would reach at least 24 ft.

### Direct Hitch Timbering Used

In 1933, Saxton mine, Walter Bledsoe & Co., Terre Haute, Ind., adopted the direct-hitch method of timbering. Using a shop-constructed drilling machine similar to that described above (Coal Age, June, 1935), 6-in.-diameter holes were drilled on each side of the permanent haulageway near the top. The depths of holes were 2½ ft. on one side and 5 ft. on the opposite for some sections, and 1½ ft. on one side and 3 ft. on the opposite side where good rib conditions permitted. Relaying rail, 60 lb., was used as cross beams. Wedges, 3x5 in., were used under the rail for leveling purposes only. In the early installations, the rails were cemented into place. As the walls began to slough off, it was impossible to determine the depth of the hitches, so this practice was abandoned. By leaving the holes open for inspection the depth of bearing surface could be readily determined. The holes were drilled on 4½-ft. centers. The minimum clear height was 5 ft. with a width of 12 ft.

The No. 4 seam worked at Saxton, averaging 5 ft. in thickness, is overlaid by a gray slate varying from 4 ft. to 9 ft. in thickness, which makes a fairly good top if taken care of within a reasonable length of time. Most of the cuts were made in coal.

### Pin-and-Stringer Plan Adopted

In 1941 it was decided to adopt the pin-and-stringer method of timbering to obtain greater steel recovery. Holes 6 in. in diameter are drilled with the machine to a depth of 5 ft. on 10- to 14-ft. centers. Original depth was 4 ft. but sloughing of the rib, with resultant loose pins, led to an increase to 5 ft. Rail of 70-lb. weight is preferred for pins which are 6 ft. in length and extend 1 ft. out of the hole. The pins are placed in the holes and leveled with wedge caps. The wedges are not driven tight and no fill is inserted in the holes. Rails of 70-lb. weight 12 ft. to 15 ft. long are set on the pins to make stringers. Crossbars of 60-lb. rail approximately 11 ft. long are placed on the stringers and followed by lagging if necessary. Finally, wood cap pieces are driven home between the crossbars or lagging and roof, holding the entire structure tight against the top. In timbering across wide openings, such as junction points, concrete-

block piers or corners are used to support the longer spans.

Two men on a shift can drill an average of 20 holes without trimming. With steel available and holes drilled, a two-man crew can put up 24 to 30 ft. of timbering, including lagging, in a shift.

### Failures Are Rare

There have been no failures with the pin-and-stringer method and only one failure with the direct-hitch method—this failure was attributed to shallow hitching—in three to four miles of “legless” timbering over a period of 12 years.

Tallydale Mine, Snow Hill Coal Corp., Terre Haute, Ind., has used the pin-and-stringer method exclusively since 1936 for timbering permanent and long-lived temporary haulageways. To secure the 5-ft. pins in the holes, which are 6 in. in diameter and drilled 4 ft. deep by a machine similar to the type previously described, two methods are employed. Where only two to three years of life is anticipated, wedge-shaped blocks are inserted in the hole after the pin is set to hold it in position. This facilitates later recovery of the pins. For more permanent work, after the pin is set level with the aid of wood wedges if necessary, the back of the hole is filled manually with concrete, loose material is packed around the pin to within 1 ft. of the face and concrete is used to fill the remaining distance. Pins normally are set on 5-ft. centers, stringers are 11 to 30 ft. long and crossbars are 11 to 12 ft. long and are set on 3-ft. centers. Originally, the crossbars were set on 6-ft. centers, then 5-ft., then 4-ft. and 3-ft. Brick piers or posts are used to support longer spans.

The No. 3 seam worked at Tallydale averages 6 ft. in thickness and sufficient top is taken on main entries to insure a minimum clear height of 5 ft. over the rail. The “aimed for” height is 6 ft. The width of the main entry is nominally 12 ft. The immediate roof over the coal consists of 10 to 15 ft. of crumbly slate which cuts badly and must be timbered to hold it in place. Cuts for hitches are made in coal, rock or slate depending on the thickness of the seam and the grade of the haulageway.

### Beams Less Costly Than Rail

Relaying rail of 60-lb. weight has been used in the past for pins, stringers and crossbars. However, a recent investigation of costs and other factors indicated that 5-in. 14.75-lb. standard beams were less costly than the 60-lb. used rail and had additional advantages.

Average cost for relaying rail is \$33.50 per net ton without allowance for cut-

**Table I—Relative Values of 60-Lb. Steel Rail and 5-in. Standard Beam**

New Rail				Standard Beam			
Depth (In.)	Wt. Per Yd. (Lb.)	Wt. Per Ft. (Lb.)	Section Modulus (In. <sup>3</sup> )	Depth (In.)	Wt. Per Ft. (Lb.)	Section Modulus (In. <sup>3</sup> )	Savings in Wt. Per Ft. (Lb.) (Percent)
4 1/4	60	20	6.6	5	14.75	6.0	5.25 26

**Table II—Relative Values of New Steel Rails and Beams**

New Steel Rails				Beams					
Depth (In.)	Weight Per Yd. (Lb.)	Weight Per Ft. (Lb.)	Section Modulus (In. <sup>3</sup> )	Depth (In.)	Type	Weight Per Ft. (Lb.)	Section Modulus (In. <sup>3</sup> )	Savings in Wt. Per Ft. (Lb.) (Percent)	
5¾	100	33.33	14.6	6	H	25.0	15.7	8.33	25
5⅜	90	30.00	12.2	6	H	20.0	12.9	10.00	33
5⅜	85	28.33	11.1	6	H	20.0	12.9	8.33	29
5	80	26.67	10.1	6	H	20.0	12.9	6.67	25
4⅜	75	25.00	9.1	5	H	18.9	9.5	6.1	24
4⅝	70	23.33	8.2	5	H	18.9	9.5	4.43	19
4⅞	65	21.67	7.4	5	H	18.9	9.5	2.77	13
4¾	60	20.00	6.6	5	Std.	14.75	6.0	5.25	26
4⅞	55	18.33	5.8	5	Std.	14.75	6.0	3.58	19
3⅞	50	16.67	5.0	4	H	13.0	5.2	3.67	22
3⅞	45	15.00	4.3	4	H	13.0	5.2	2.00	13

ting, which sometimes is necessary. On this basis 1 ft. of 60-lb. relaying rail costs \$0.335. Assuming that the standard beam costs roughly \$45 per net ton delivered, 1 ft. of 5-in. 14.75-lb. standard beam costs \$0.332—a saving per foot of \$0.003.

### Beams Are Lighter

In addition, the beam is 26 percent lighter. An 11-ft. section weighs 58 lb. less, making for easier handling. It has uniform sectional and physical properties as opposed to the uncertain properties of a rail which has seen hard service, and it is a balanced section, minimizing the danger of overturning in the hole, with resultant smashed fingers.

In nine years' experience with some five miles of this system of timbering, only six pins have sheared and there has only been one minor roof fall due to a sheared pin.

Coal operators in western Pennsylvania and northern West Virginia have recently shown increased interest in the use of steel sections for mine-roof supports in main haulageways and butt entries. This interest can be attributed for the most part to four factors:

1. The growing scarcity and increased cost of wood.
2. Higher mine labor costs, which increase the cost of replacing the comparatively short-lived wood timbers at regular intervals.
3. The scarcity and increased cost of relaying rail.
4. The realization that a structural

steel section of equal strength (compared to rail) is lighter in weight and has more desirable properties for timbering.

Table II shows that for equivalent strength beams are much lighter than new rails. The deflection is less with the lighter weight with only a slight increase in depth of section, resulting in greater stability. The wider flanges of the beams offer much better support for lagging. Moreover, rails do not lend themselves readily to fabrication on account of high carbon content, making it necessary to drill instead of punch and increasing the hazards and cost of torch cutting and welding.

### Timbering Main Haulageways

One large western Pennsylvania operation is completely timbering its main haulageways by the direct-hitch method. The holes are slotted into the rib by a track-mounted universal machine as the heading is driven. Holes vary in size to hold a suitable structural steel section. While 6- and 8-in. H beams and CBL-6 sections are commonly used, experience may dictate that a larger or smaller beam is required. Holes are 3 1/2 ft. deep on one side and 1 1/2 to 2 ft. deep on the other. After the beam is centered it is cemented flush with the face with a 1-2-4 mixture of concrete. It is reported that the concrete keeps the air out, preventing spalling or sloughing, and transmits the burden from above the hole directly to the coal below without lip fracture. This operation has main haul-

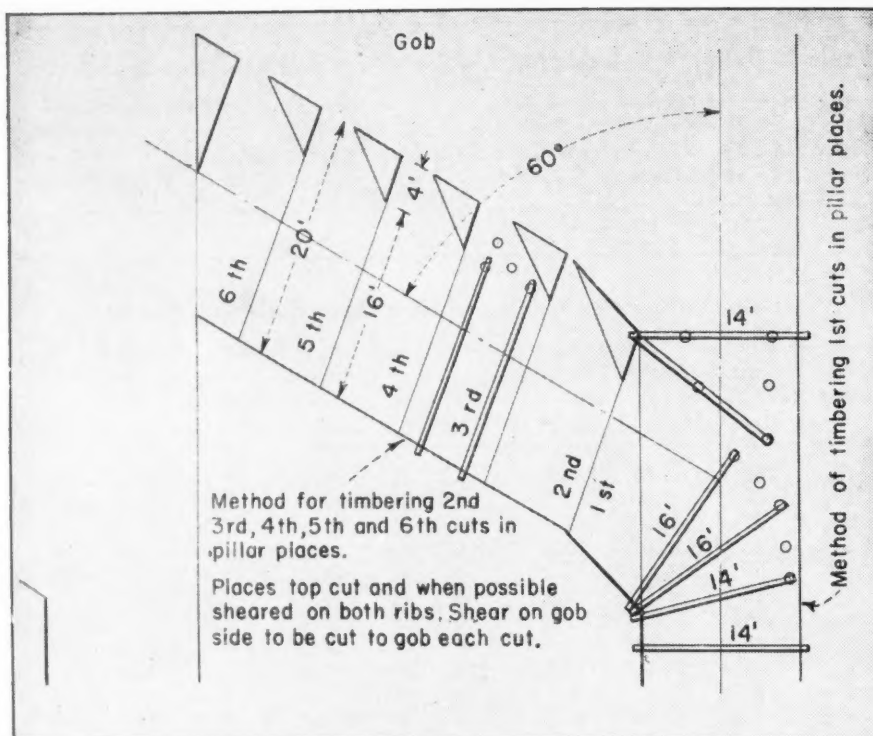


Fig. 4—Hitching crossbars in slots made by cutter in pillar work.

ageways 10 to 12 ft. wide with a mined height of coal of  $5\frac{1}{2}$  to 6 ft.

Another western Pennsylvania company using the direct-hitch method takes rock from the roof for clearance and has rock ribs for hitches. Holes are drilled shallower, because of the demonstrated stability of the rock, with a suitable drill.

#### Other Variations In Methods

A third operator utilizing the direct-hitch method encountered friable, soft-structure coal and found it advisable to make holes deeper.

Still another in the district has adopted a novel modification of the pin-and-stringer method, using stringers only at crosscuts. Two pins are required in each rib to support a suitable steel cross beam which rests on a steel plate lying across the exposed ends of the pins.

The holes are drilled 4 in. apart to form a "V" with the apex at the face of the rib (Fig. 2). Holes are 3 to  $3\frac{1}{2}$  ft. deep and are large enough to hold comfortably a 25-lb. rail. The pins are firmly secured either by wedging or cementing, depending on the length of service required, with 8 in. protruding. A  $\frac{1}{4}$ -in. steel plate is placed across the two exposed rail ends on each side. A suitable cross beam then is set on the plates and wedged firmly into place. The entries are driven to a uniform width of 12 ft. and the beams are spaced from 4 to 6 ft. apart, depending on the condition of the roof, in such a manner that lagging may

be used if necessary.

The method of timbering is particularly efficient where the ribs are friable and have a tendency to slough. Where long-lived timbering is required, it is desirable to maintain a uniform width. It has been found that by shearing on both sides stronger and more uniform ribs are obtained. The force of blasting often affects the ribs.

#### Hitches Cut by Machine

This operator also uses the direct-hitch method for temporary timbering. The places are sheared on each rib and the hitches are made by a universal machine while the cutting is being done. After the place is cut, two timbers on approximately 4-ft. centers are placed in the hitches. The maximum distance from timbers to face when starting to cut is about 10 ft. and the maximum distance from timbers to face when starting to load is about 2 ft. This could not be as safely accomplished with post timbering because of the necessity of loading out coal and machine cuttings prior to setting posts. If roof conditions are "bad," timbers are put up by the direct-hitch method before the place is cut. This makes cutting more difficult but affords proper protection to the cutters.

In pillar places where the open-end system of mining is used, the timber is hitched in one rib only and the other end is supported by a leg or crib, depending on roof conditions.

Experience over the years warrants the following conclusions:

1. The direct-hitch, pin-and-stringer or modified pin-and-stringer methods of timbering without legs or posts can be adopted for permanent haulageway roof support whether the ribs be rock, hard, stable coal or coal with a soft, friable structure.

2. All of the companies using these methods of timbering report the following advantages of "legless" timbering:

Permanent, safe protection is possible at a reduction in cost of installation as compared to other recognized permanent timbering methods; e.g. walls, piers, etc.

Lost-time accidents, lost production and attendant labor and material costs caused by derailments are minimized along with elimination of the hazard of falling timber, lagging and roof from knocked-out posts or legs.

Frequent retimbering because of decay of legs and accidents resulting from improperly set posts are eliminated.

3. While relaying (secondhand) rails have been used successfully in the methods of timbering previously described, it is recommended that new structural steel sections be used throughout in the interest of safety which, after all, is the prime reason for any timbering. New structural steel sections have the following proved facts to recommend them over relaying (secondhand) rails:

They are balanced sections with definite uniform sectional properties as compared with the irregular profile and, therefore, indefinite sectional properties of rail which has suffered wear and abuse in service.

They can be purchased to guaranteed minimum physical properties with uniformity throughout and with a definite factor of safety which, of course, is out of the question with used rail.

They are lighter for equivalent strength, minimizing labor and strain in handling.

They can be fabricated with more ease and with less possibility of setting up future sources of danger, e.g., brittleness aggravated by torch cutting or welding unless precautions are taken.

Their cost per foot is less under present conditions. It is believed that an additional extra original cost for materials would be warranted by the safety factors involved.

Secondhand rails have been known to collapse without warning, causing fatal accidents and considerable loss of time and tonnage. This type of rail will not bend after it has been more or less crystallized in haulage service and is a definite hazard, particularly when used as cross-timber.

# SPECIAL EQUIPMENT

## Boosts Efficiency at Trackless Operation

Shortwall Carriers, Supply Trucks and Belt Winder Among Equipment Made on the Ground to Cut Operating Costs — Tractor-Trailer Units Haul to the Belt System — Output 10 Tons per Man in 58-In. Seam

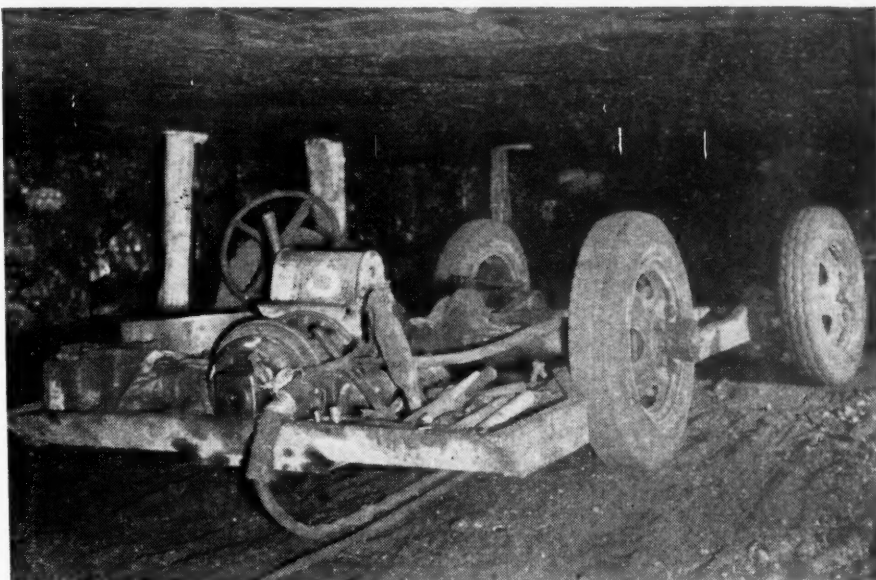
By R. R. RICHART

Assistant Editor, Coal Age

MACHINE CARRIERS, material trucks and a belt winder are a few of the pieces of "unpatented" equipment improving the efficiency of mechanical-mining operations at the Moss Hill No. 9 mine, Hart-Ross Coal Co., Mortons Gap, Hopkins County, Kentucky. In this trackless mine, motorized rubber-tired machine carriers enable three shortwall crews to cut for two 14 BU Joy loaders. Three Baker tractor- and Fletcher trailer-type shuttle-car units are required to haul the coal from each loader to the belt-loading station. Checking the power consumed by the various belt drives at least once a month helps to disclose faulty rollers and, on the belts that are extended, to determine when it is necessary to change to a larger motor to escape a burnout from overload. Production from the 58-in. No. 9 seam averages 2,200 tons for the two shifts, or 10 tons per man for everyone on the payroll.

The mine is located in Muhlenberg County about eight miles from the office in Mortons Gap. Between Mortons Gap and White City, the site of the screening plant, general shop and store-room, there is a four-mile gravel road. Linking White City and the mine is a four-mile-long standard-gage railroad owned by the company.

The present operation, started in 1943, is the most recent of several openings from which coal under the nearby hills and ridges has been mined. A single-track wooden tippie, lamphouse and foreman's office are the only buildings on the surface. A 5-section 5-ply 30-in. 5,000-ft.-long belt-conveyor system transports the coal loaded at two widely separated loading stations underground to the tippie. Here the run-of-mine coal is loaded in railroad cars for shipment to the screening plant at White City. Because the rate of extraction is high the life of an opening is but a few years. A new operation



Many of the parts for the machine carriers came from standard-make cars and trucks.



With the shortwall loaded, the crew is ready to move the carrier to another room.

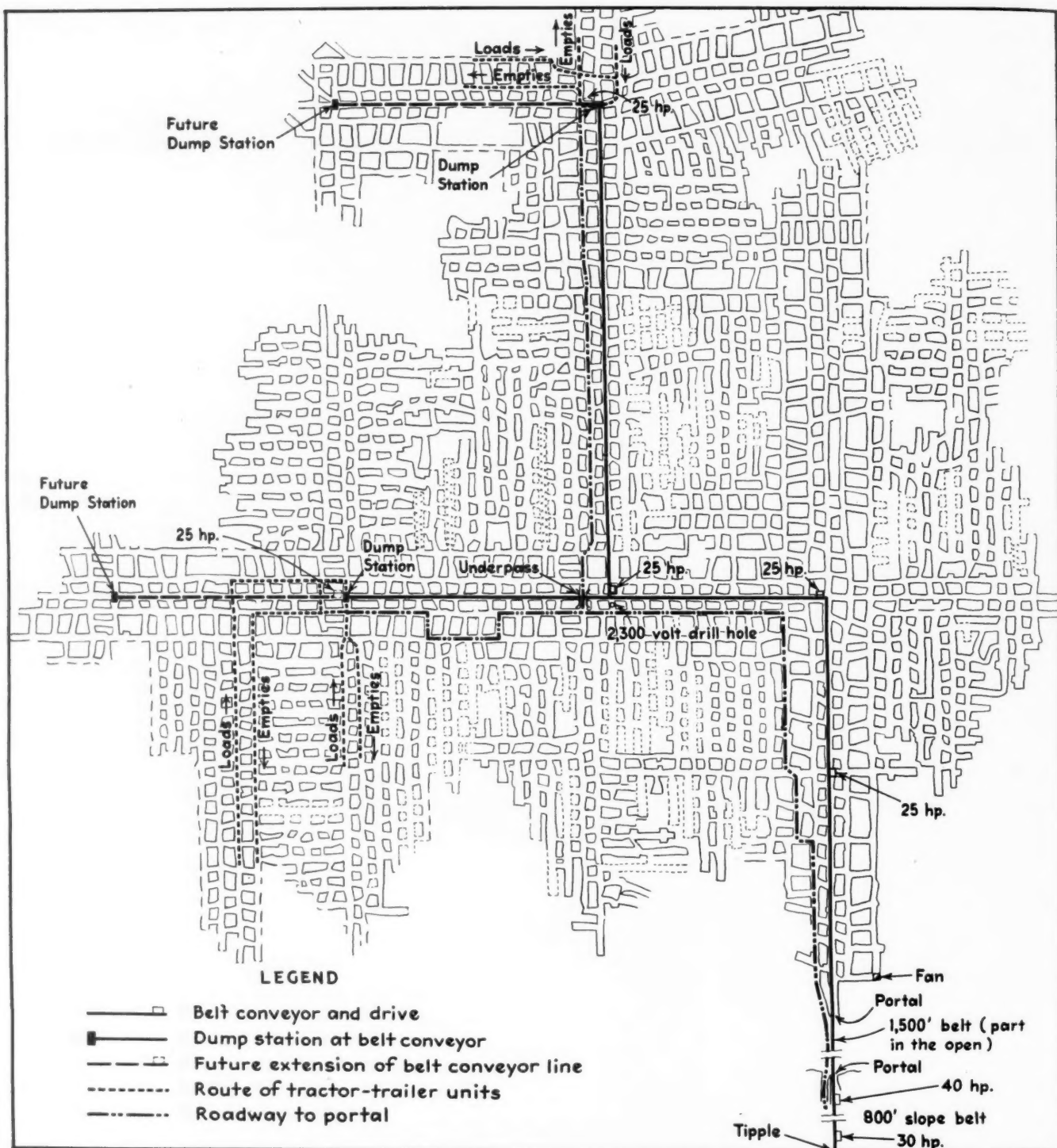


FIG. 1—A 5-section 30-in. 5,000-ft. belt-conveyor system transports coal from two underground loading stations to the tipple.

is begun farther up the valley before the old one plays out.

To facilitate the movement of equipment and supplies underground and thereby lower mining costs, the management designed and built some pieces of special equipment. Perhaps the most important of these and one that helps to eliminate the production bottleneck at the face—that of keeping the cutting up—is the motorized machine carrier. This unit, assembled from parts of standard-brand cars and trucks and

powered by a 10-hp. 3-phase 220-volt 60-cycle slip-ring motor, enables a two-man crew to cut more places with a 50-hp. Goodman shortwall machine. In each section, three shortwall crews cut enough places in this 58-in. seam for two 14 BU Joy loaders. Each shortwall has an 8-ft. bar equipped with Cincinnati chain and bits.

Following the three cutting crews in each section are two drillers with push carts for carrying the post-mounted Dooley drills equipped with Hardsocg

augers and bits. These drills, like the other face equipment, operate from the 3-phase 220-volt a.c. power supply.

When anything has to be pulled about underground or taken in or out of the mine the call goes out for one of the Baker tractors. Twelve of these units normally are in shuttle service between the loading machines and belt-loading stations. Others are used throughout the shift to cart supplies around. Each tractor has four 7.50x15-in. tires on the rear axle and two

6.00x9-in. on the front. Each tractor gets its power from a 24-cell 19-plate 48-volt Exide-Ironclad battery. While a tractor is serving a loading machine it may change batteries two or three times a shift, depending on the grades encountered on the one-way circuit that it travels.

For carting supplies around a two-wheeled solid-tired flat-bed truck is coupled to a tractor. The bed of the truck is large enough and low enough that as many as 40 4x8-in. crossbars 14 ft. long can be hauled at a time through a crossbarred entry having a clearance of only 52 in. These trucks also are used at times to transport visitors. However, when it is convenient, better riding may be had in the trailer used for hauling the coal. Practically all of the man trips employ the trailers, each trailer accommodating twelve men.

In moving transformers, three 25-kva. units are hauled in an upright position on a sled pulled by a tractor. The heading clearance is so tight that the clamps holding the covers are unscrewed and turned down while the transformers are in transit. This is better than emptying the fluid, laying the tanks on their side while in transit, and then filling them again—thereby running a chance of contaminating the coolant.

### Belt Winder Speeds Handling

A belt winder built with gearing from a shortwall machine, a gear and pinion discarded from the screening plant, a 10-hp. a.c. motor and control, and steel framing mounted on wooden runners provides a convenient way of winding up rubber belting. As much as 250 ft. of 30-in. belting can be rolled into a 38-in.-diameter spool in a few minutes by this winder and one man operating the controls. This device eliminates many hours of laborious work. The spools are carted and stored in this same workwise position since the clearance to the roof will not permit turning the rolls on their side for transporting on the truck. The winder also is used as a winch to drag as many as six 9-ft. sections of the Barber-Greene troughing carriers at a time out of the heading after the belting has been removed and placed out of the way.

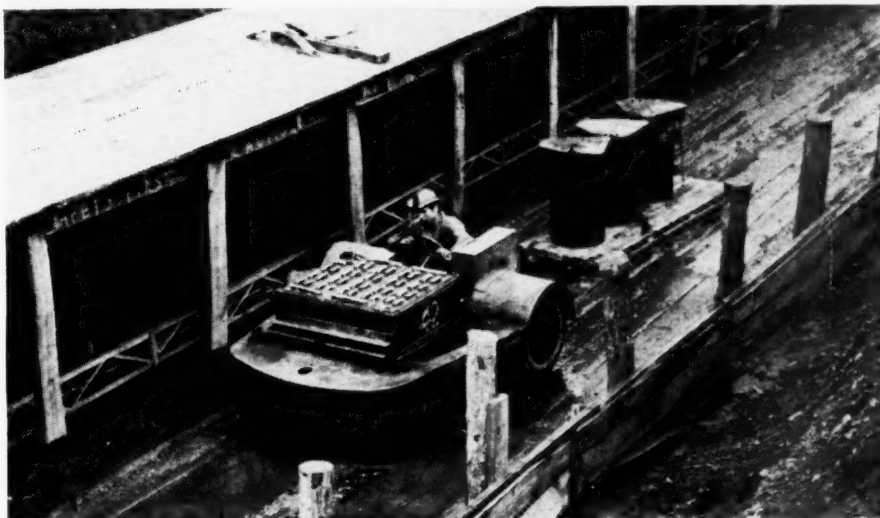
These contrivances are helping to improve the efficiency of the underground operations built around the second installation of the original Fletcher tractor-trailer type of gathering equipment. The trailers, drawn by Baker tractors, haul about 3½ tons per trip. The body has sloping sides and three drop-bottom doors, and travels on 7.50x15-in. dual tires. In overhauling a trailer



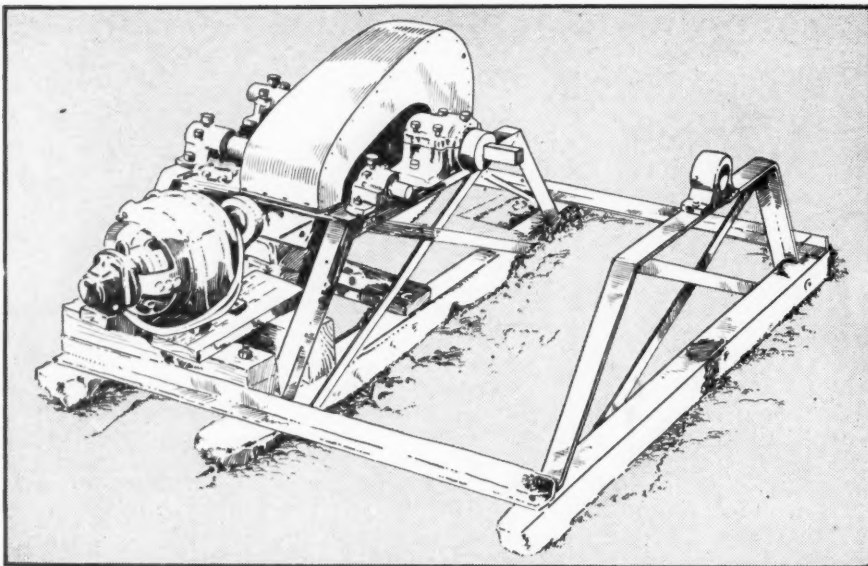
Each driller uses a push cart to move his equipment.



Old tires are brought out from the inside shop on a material truck.



How the transformers are moved in an upright position in the 58-in. seam.



The belt winder was assembled from several machine parts that had been discarded.



The trailers cannot be loaded to the limit in a timbered place.



One of the tractor-trailer units on its way to the dumping station.

the body is replaced by one built at the general shop. The Sanford-Day drop-bottom doors, however, are purchased from the manufacturer.

In developing at Moss Hill No. 9, five headings are driven wherever the belt line is to be installed. The three inside headings are on 36-ft. centers and the outside ones are on 60-ft. centers. The extra thick outside chain pillars afford protection to the inside headings, especially to the belt line which is installed in the 12-ft.-wide middle heading. The other headings in the group are approximately 15 ft. wide. A brattice line divides the group, putting two headings on the intake and three on the return. Panel headings are driven in groups of three on 40-ft. centers. Most of the rooms are driven 24 ft. wide and 250 ft. deep or, in some instances, to the outcrop.

### Section Employs 32 Men

Each loading machine works a six-room territory aided, of course, by on-shift shooting. Two loading machines are assigned to a section and all of the coal goes to a single loading point. A total of 32 men are required to man a section and they are assigned as follows: pumper; three cutting-machine operations; three helpers; two loading-machine operators; two helpers; two drillers; two shot firers; three bottom lifters; six tractor-trailer operators; two mechanics; three timbermen; battery-charging man; and two foremen who also look after the dumping station.

If the coal is easy to shoot three holes are drilled to a 24-ft. face; otherwise, four are used. All holes are started 18 in. from the roof and angle up to within 4 in. of the roof at the back of the 8-ft. cut. The rib holes are 18 in. from the rib and drilled parallel to it. The inside holes angle to the center of the face. All holes are loaded with two 1½x8-in. sticks of Hercules Red HC sheathed permissible powder and fired with duPont electric blasting caps.

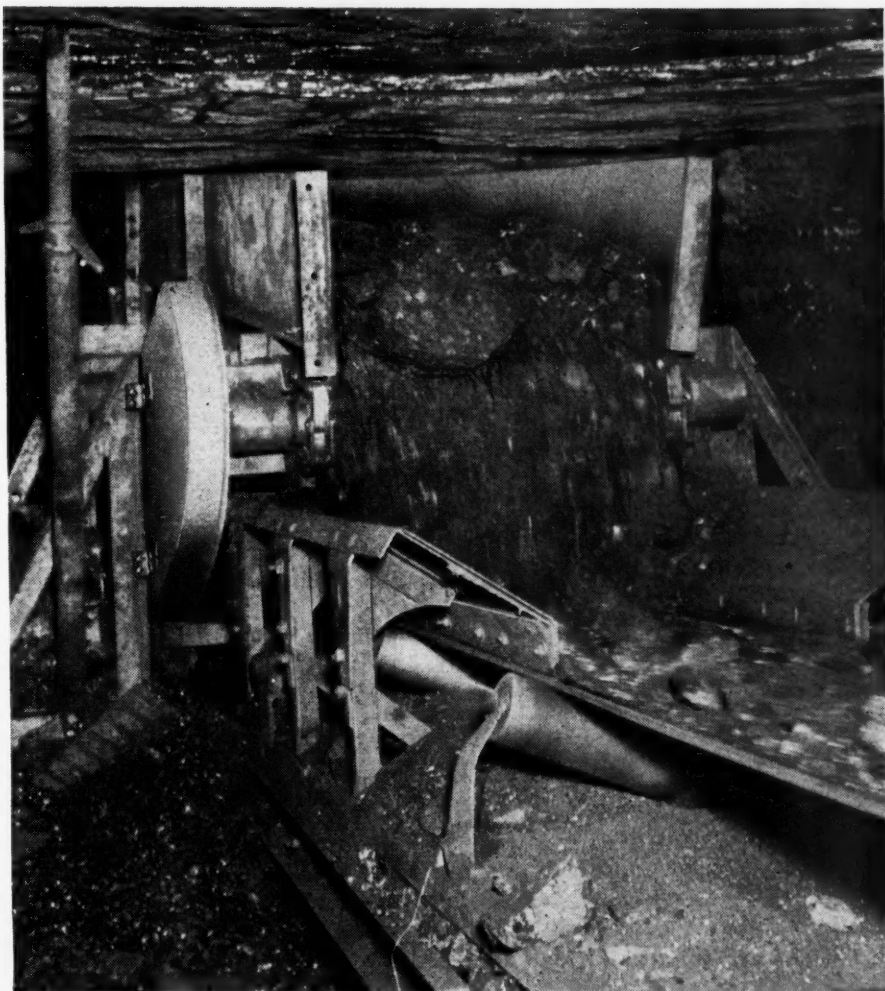
When bad top is encountered 4x8-in. crossbars 14 ft. long (spaced sometimes on 6-ft. centers) are set on props spaced 12 ft. apart. Twelve feet provides enough clearance for any piece of equipment that must travel the rooms and headings. The pay load hauled by a trailer is somewhat less than 3½ tons when the loader is working under top that is crossbarred.

The belt lines usually are extended 500 ft. at a time and each belt splice is made with 20 No. 1½ Flexco splices. All belts travel 316 f.p.m. and are rated at 250 t.p.h. At each new dump or transfer station 8 ft. of rock (20 cu.yd.) must be removed to accommodate the

steel hopper. A spare 8 BU Joy loads this rock. When the new station is complete, a 20-ft.-long inclined conveyor, also built in the mine shop, takes the coal from the pit and discharges it onto the belt.

At each transformer bank, both underground and at the tippie, are three 15-kva. 2,300-volt capacitor units, installed at the recommendation of J. H. Fletcher, consulting engineer for the company. These capacitors provide better voltage at the face. This is of vital importance since the starting torque of an a.c. motor varies as the square of the system's voltage, i.e., 90 percent of rated voltage only gives 81 percent of rated torque. These capacitors also reduce line losses on the 2,300-volt transmission circuits and improve the overall power-factor of the mine load. Capacitors improve power-factor from the point of application on an a.c. circuit back to the generating station.

Officials and supervisors of Moss Hill No. 9 mine are: Brent Hart, president and general manager; U. W. Powell, assistant general manager; A. L. Bishop, general superintendent; Bud Jones, mechanical engineer; J. L. Page, preparation engineer; Tom Fowler, chief electrician; Will Tolleferro, master mechanic, who built most of the special equipment described in this article; George Hibbs and George Blalock, foremen; and Hubert Drennan, manager of the clubhouse at the mine. Surveyors from Jones & Donan, Madisonville, Ky., visit the mine twice a week.



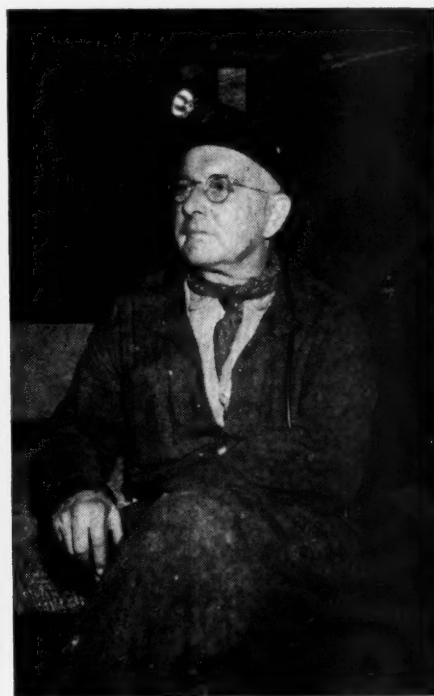
An elevating conveyor moves the coal from the pit to the belt conveyor.



Brent Hart is president and general manager of the Hart-Ross Coal Co., operators of the Moss Hill No. 9 mine.



Willie Lovan, face boss, takes his turn at the dumping station. Note the short cane used as a walking aid in the 58-in. seam.



A. L. Bishop, general superintendent, checks over operation of one of the underground dumping stations.

# CONFERENCE METHOD

## Promotes Efficiency in Mine Supervision

Foremen's Training Conferences Promote Efficiency in Mine Supervision and Bring Collective Experience to Bear on Problems—Exchange and Discussion of Ideas Develop Valuable Information and "Know-How"

By **LEE HARRIS**

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IF TWO HEADS are better than one, then ten heads should be better than two. That axiom contains a world of truth and from its practical application coal operators can derive countless benefits leading to more efficient and profitable operation. One way of getting these benefits is the successful holding and handling of foremen's training con-

ferences. Such conferences are not a new and ingenious device of an ultra-modern business world but are a tested and valuable means of adding plain "horse sense" to modern business operations. The value of the foremen's training conference has been demonstrated in, among other places, Kentucky, where local boards of education in cooperation with the Division of Vocational Education have conducted conferences for many industrial firms.

Two major factors are involved in a successful foremen's training conference. The first requisite is an experienced conference leader. Second, all men at-

tending the conference must be on the same level so that they may talk freely without being cramped by the presence of superiors. Then, with a capable conference leader, the stage is set for developing much valuable information.

As the conference opens, the foremen make up what is called a "laundry list." This is a list of problems that they encounter every day. From this laundry list, topics are chosen for discussion, usually in the order of their importance to the foremen. All opinions brought out at the conference are recorded as group opinions and are not attributed to any single foreman.

### PROMOTING COOPERATION AMONG EMPLOYEES

Causes of Poor Cooperation	Evidence of Lack of Cooperation	Remedies Available to Supervisor
1. Misunderstanding.	1. Failure to accept job.	1. Better understanding.
2. Indifference.	2. Absenteeism.	2. Self-inventory to find weaknesses.
3. Lack of information.	3. Waste.	3. Recognition of other persons' ideas.
4. Violation of policies.	4. Carelessness.	4. Exchange of ideas.
5. Incompetence.	5. Failure to observe rules.	5. Encouragement.
6. Misfits.	6. Disregard of orders.	6. Prompt and satisfactory grievance settlement.
7. Dissatisfaction.	7. Decreased efficiency.	7. Fair and honest dealing.
8. Old grievances.	8. Delays.	8. Careful weighing of all the evidence.
9. Imaginary grievances.		9. Gaining confidence in men.
10. Poorly expressed orders.		10. Giving proper instructions.
11. Lack of confidence in other persons.		11. Giving full information.
12. Lack of self-confidence.		12. Taking time to listen to grievances.
13. Poor leadership.		13. Making proper placement.
14. Lack of ability.		14. Developing morale.
15. Fear in relation to: Failure. Superiors. Physical set-up. Criticism.		15. Developing competitive spirit. 16. Encouraging initiative. 17. Creating personal interest.

Recognizing that none are perfect but that all can come closer to perfection through exchange of ideas on a problem of mutual interest, the conference leader sets about getting the foremen in attendance to talking freely. The opinions of some are modified to make for better teamwork. The foremen analyze their own jobs and responsibilities. An organization chart frequently is drawn up so that the conference attendants can understand clearly their places in the company set-up. The conference leader tells the foremen very frankly that he does not know their jobs and does not pretend to, but that as conference leader he can help them discuss problems and formulate opinions for the benefit of all concerned.

Mine Foremen Discuss Problems

The Kentucky plan, with which this article deals, involves, as previously stated, sponsorship by the local board of education and leadership of conferences by a representative or representatives of the Department of Industrial Education of the University of Kentucky. To show how the plan works, experience in holding a conference for one coal company might be cited. This conference was attended by 20 officials with a combined coal-mining experience of 567 years.

Major problems picked from the "laundry list" for discussion were:

- 1. Promoting cooperation among employees.
- 2. Eliminating absenteeism (this was in wartime).
- 3. Selling employee interest in the company.
- 4. Recognizing desirable characteristics in a satisfactory foreman.

Following the technique of a doctor with a sick patient on his hands, the problems were first approached by determining the cause and then prescribing or applying the remedy.

On securing cooperation among employees, for instance, the foremen listed the causes of non-cooperation shown in the accompanying tabulation and then agreed unanimously that the "remedies" suggested would make for smoother mine operation if applied. In developing the tabulated list of "ailments and remedies," it was not the thought that any one ailment could be cured by any one remedy but rather that a prescription involving a combination of several of the remedies would produce the desired results or greatly work to that end.

In discussing absenteeism—still somewhat of a problem—the group again charted the causes, putting transportation first as the major factor in keeping workers from their jobs. Also charted were the ways in which absenteeism

Causes of Absenteeism and Their Cures\*

Causes of Absenteeism	Ways to Combat Absenteeism
1. Transportation: Old cars. Inadequate garage service. Drivers out.	1. Board at entrance of mines with names of boys in service.
2. Pay day.	2. Occasional letters to workers.
3. Order day.	3. Honor roll for attendance.
4. Alarm-clock shortage.	4. Other attendance praise.
5. Sickness: Workers. Members of family.	5. Establishment of physical check-up policy.
6. Members of the armed forces home on furlough.	6. Effective discipline.
7. Exhaustion.	7. Playing of patriotic records.
8. Indifference.	8. Establishment of an effective poster system—for example: "Do you have someone in the service? Did you work last shift?"
9. Miscellaneous causes.	*Based on wartime conditions.

FOREMAN'S CHARACTERISTIC CHART

	0	1	2	3	4	5	6	7	8	9	10
ABILITY TO MAKE DECISIONS											
ABILITY TO SELECT SUBORDINATES											
ADAPTABILITY											
AMBITION											
CHARACTER AND HABITS											
COOPERATION											
COURAGE											
DIPLOMACY											
DISCRETION											
ENERGETIC											
ENTHUSIASM											
FAIR AND OPEN MIND											
FORESIGHT											
GOOD HOUSEKEEPING											
HEALTH											
HONESTY											
INGENUITY											
INITIATIVE											
INTEREST											
JUDGMENT											
KNOWLEDGE OF JOB											
KNOWLEDGE OF SAFETY, FIRST AID											
LOYALTY											
PERSONALITY											
PLANNING											
POISE											
PRACTICAL EXPERIENCE											
RELIABILITY											
RESOURCEFULNESS											
SALESMANSHIP											
SELF CONFIDENCE											
SELF CONTROL											
THRIFT											
TRUTHFULNESS											

## SELLING EMPLOYEE INTEREST

### Advantages to Employees

1. Stability of payroll, employment, financial responsibility and advancement.
2. Fair treatment.
3. Top pay.
4. Maximum running time.
5. Good working conditions.
6. Social benefits, such as hospitalization, group insurance, adequate bath houses and medical, burial and personal benefits, including aid in all types of endeavor, helpful advice, assistance with personal problems, assistance to employees' families.
7. Progressive policies based on modern equipment for mining and preparation, safety training, safety equipment, first aid, machine operation, training.
8. Security for employees based on past performance of mines, unlimited coal reserves, progressive policies, favorable natural mining conditions and future planning to maintain increased production.
9. Good local public relations.
10. Sales policies insuring future markets and involving maintenance of the reputation of the product and service, standards and competitive position, sales service and research, reserves of coal adaptable to special preparation and purposes, broad and varied market outlets, maintenance of an adequate selling organization and a well-planned and established advertising program.
11. Buying policy assuring adequate supplies, safe operating conditions and minimum loss of time, plus maintenance of advantageous contacts and encouragement of reciprocal business.
12. International reputation as a result of good publicity and a source of new ideas.
13. Good location accessible to the public; large marketing areas; good roads with U.S. main highway north and south; north-and-south trunk-line railroads; low-rent area, favorable building locations, good community, good churches, good schools.
14. Recreational facilities, which should include hunting, fishing, golf, bowling, swimming, basketball, football and other sports.

### Selling Methods

1. Maintenance of proper attitude.
2. Emphasis on personal contacts.
3. Enlistment of group-leader and key-man cooperation by conference methods and planned meetings.
4. Company publications with good pictures featuring progress plus personal commendation, informative items, byproducts of coal, etc.
5. Promotion of social activities.
6. Radio programs such as quizzes, interviews, round-table discussions, romance and future of coal, byproducts, etc.
7. Motion pictures — sound and silent.
8. Trips through mines.
9. Vocational training.
10. Posters and bulletins.
11. Placing definite responsibility in some department.
12. Personal-interest stories in newspapers, pictures, new developments, general information on the coal industry.

might be eliminated or at least reduced. The results are shown in another tabulation in this article.

On the problem of selling employee interest in the company, the foremen discussed a situation that many businesses fail to recognize even in this day of streamlined modes and methods. The foremen, alert to the vital part this activity plays in the profitable operation of all business, discussed this problem at great length. After determining the many advantages to the employer and the many ways of selling the employee interest in the company, the foremen recommended that this program of information could be best put into practice by making it the responsibility of a particular person or department. Advantages to the employee and ways of getting him to see them were set out as shown in the accompanying tabulation.

### Chart Rates Foremen

Another accomplishment of the conference was a foreman's characteristic chart, reproduced elsewhere in this article. Characteristics listed totalled 34. By using a scale with a top of ten and going down to zero for absolute imperfection, it is possible to rate foremen according to the various qualities they should possess, thus making comparison or selection relatively easy. No attempt was made to arrange the characteristics according to importance.

A review of the accomplishments of the training conference shows that members of the supervisory force can be the source of a vast quantity of information. Often, a company looks to outside specialists to solve its problems while it neglects one of the most valuable of its assets—supervisory opinions and suggestions. The conference is a way of bringing them out.

Conferences may be set up by the companies themselves with leaders from their own staffs or they may, as in Kentucky, be held with state and local assistance. Local boards of education in Kentucky, in cooperation with the Division of Vocational Education in conducting such conferences, make it possible for companies to be spared the expense of hiring a competent conference leader or the handicap that comes from having men thresh out problems in the presence of a superior. The leader is furnished without charge in Kentucky. The only cost to the company is the time the foremen spend in conference. In many cases, however, the foremen attend on their time. The cost of such time to the company, when involved, is of course a mere pittance compared to the invaluable suggestions, opinions and "know-how" developed by the foremen, which make operation more efficient.



Lakes formed in spoil banks, such as this one in Indiana, provide good fishing and recreational facilities, while the locust on the lower slopes and pines on the ridges not only supply timber but cover for wild life.

# SPOIL RECLAMATION

## Assures Good Income Without Leveling

Cattle and Hog Feeding Provide Good Returns More Quickly—Reforestation Still the Old Reliable Although Slower—Recreational Returns Proved—Fruit Growing a New Possibility Being Studied by Operators

TIME AND EXPERIENCE are proving that strip operators knew whereof they talked in opposing the wilder-eyed theories on reclamation of spoils advanced by those not familiar with the real situation. As a result of study by operators and forestry, soil and agricultural experts, it now appears that strip producers not only have the ammunition to beat off attacks but also to realize a good income from spoils, in addition to

generally benefitting the community.

As of the present time, these conclusions are warranted by the facts:

1. Little first-grade land is disturbed by stripping.

2. Leveling off or other spoil preparation not only is not worth the cost but actually reduces the use value of the land.

3. Recreational facilities made available benefit the entire community, which

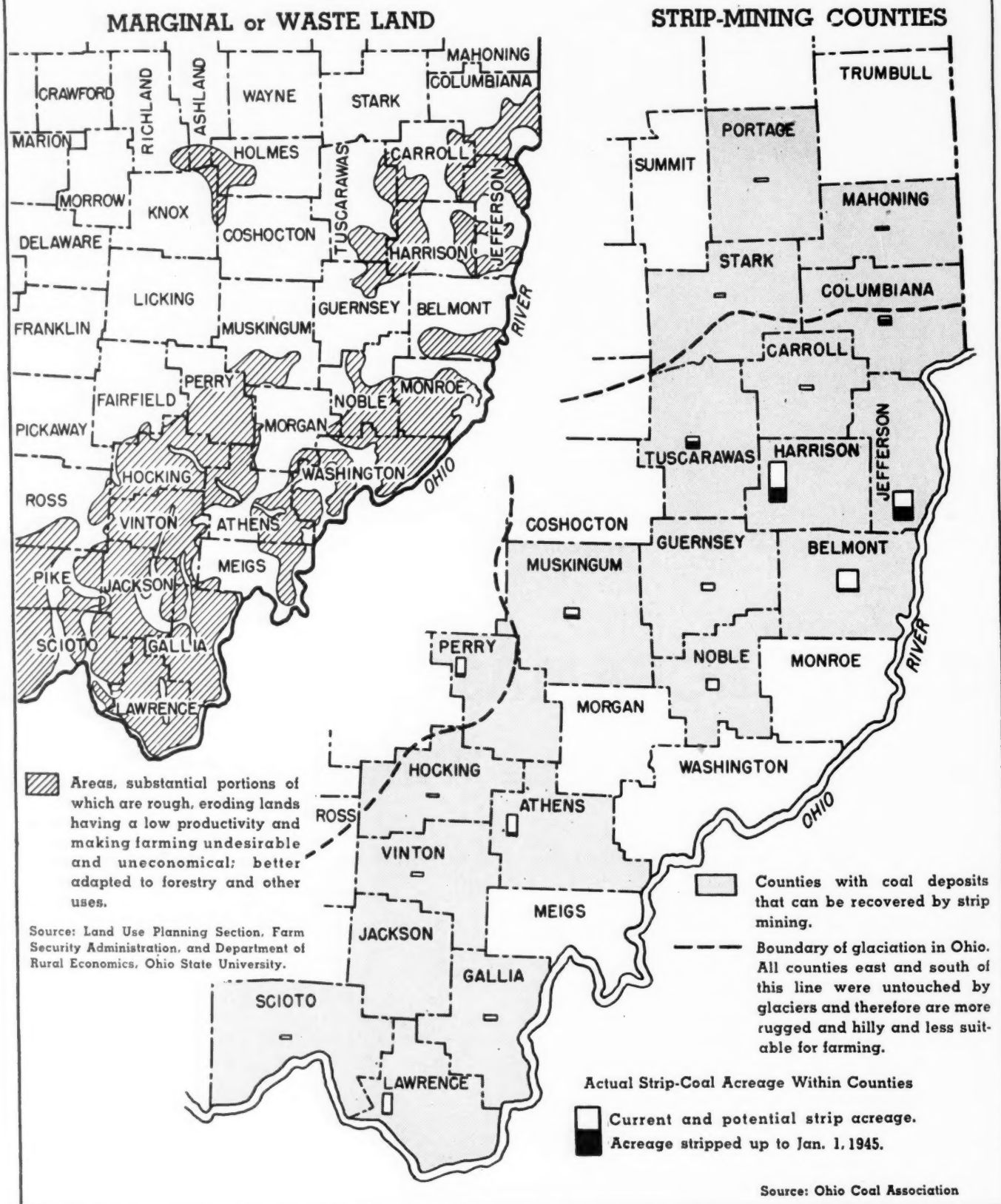
also derives advantages from cover for wild life, water storage, reduced severity of run-off and so on.

4. Operators and the community are definitely assured a good income by use of spoil areas for (a) tree growth, (b) stock raising, (c) fruit, (d) wild animal fur and food, etc.

These facts have been brought out largely by the operators themselves, with the assistance and cooperation of State

# STRIP MINING IN OHIO

Only a small percentage of total Ohio land is affected—and much of that is rough, eroding land with low productivity, not considered economical for farming



and other authorities in a few instances. Where authorities have worked with operators, as in Indiana, the various parties at interest go forward together. In others the operators have been forced to go it alone, and at the same time battle political and other attempts to fasten unwise restrictions on the industry. Briefly, and perhaps over-simply, the situation in several of the major stripping States is as follows:

**Illinois**—Legislation for leveling and other purposes passed in 1943; still to be decided by courts.

**Indiana**—Operators instrumental in securing passage of legislation in 1941 requiring revegetation, including bond of \$25 an acre.

**Kansas**—Leveling legislation proposed but defeated some years ago.

**Kentucky**—Leveling legislation defeated.

**Missouri**—Legislation for leveling and for severance tax on stripping, to be used for reclamation, defeated.

**Ohio**—Strong campaign for leveling and other restrictions initiated by Governor in 1945; number of bills presented but defeated; commission formed to study question.

**Oklahoma**—Leveling legislation defeated some years ago.

**Pennsylvania**—Legislation passed in 1945 requiring registration and bond of \$200 an acre, \$2,000 minimum, covering of seam and cut, rounding and leveling of spoil ridges and revegetation; in the courts for decision.

**West Virginia**—Leveling and covering required, along with bond.

When proponents of restrictive legislation get going, they make it sound as if every acre of land in the country was in dire peril of being turned over at once. The fact is that in no case, according to available data, does the land that possibly can be stripped exceed over 1 percent of the area of any one State, using any equipment that can be foreseen in the immediate future. In Pennsylvania, for example, it is estimated at one-tenth of 1 percent; Ohio, one-quarter of 1 percent; Illinois, two-tenths of 1 percent, and so on.

Advocates of stripping restrictions also would leave the impression that nothing but the best of land is turned over. Stripping does take in some good farming acreage, but in place of it it offers timber, recreation, stock raising, fruit growing, fur, etc. In many instances, however, the land was poor to start with. In Ohio, the stripping counties, as shown in the accompanying illustration, are primarily also the counties "substantial portions of which are rough, eroding lands having a low productivity, making farming undesirable and un-



Planting of sweet clover on an Ohio spoil bank. Followed up by forage grasses, as in Illinois, such plantings convert spoils into a profitable stock-feeding range.

economical; better adapted to forestry and other uses," according to federal and State land-use experts. In testimony given before the Ohio strip-mine commission early in 1946, it was brought out that in 1944 the average return on farm land in stripping counties was \$15.12 an acre, whereas it is estimated that timber from spoil banks would average \$12.45 an acre over a 20-year period.

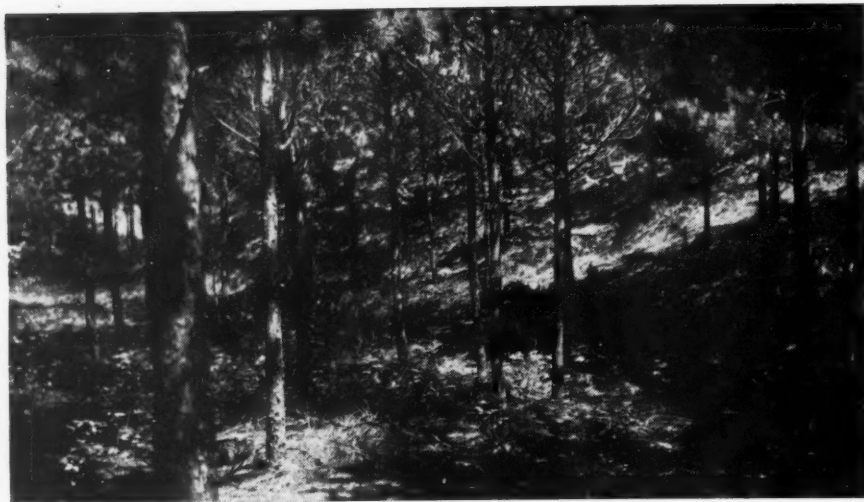
Loss of taxes is another charge against stripping that does not bear real investigation. In Harrison County, Ohio—the chief stripping county of the State—total county tax income in 1944 was \$350,000, or 20c. an acre. In 1944, 600 acres was stripped, meaning that

even if there were no offsetting levies in other directions, which there are, the total annual income of the county was reduced only \$120. If all the 15,000 acres possible were stripped and entirely removed from the tax roll, the loss in income would aggregate only \$6,000 a year, or 1.71 percent of the total. Also, testimony before the Ohio commission brought out that little or no stripped acreage is on the delinquent list, the proportion being lower than for farm acreage.

Strip-mine operators, therefore, have facts to back them in refuting statements on destruction of lands and loss of revenue, aside from the benefits the



Fish, such as this Illinois specimen, are a byproduct of pond and lake formation in stripping.



Reforestation is a proven method of spoil reclamation. This illustration, made in 1945 of mixed pines planted in 1933 and 1934, shows natural forest conditions on once-raw spoil.

income derived from stripping brings the community in the form of wages, taxes and other returns.

Early reclamation work in strip mining was largely confined to trees and sufficient experience has been gained to show that this is a good and profitable method, although stock raising and horticulture are newer avenues to equal or greater revenue. In Indiana, for example, some operators began reforestation as early as 1926. Experience has been good in this and other States, such as Illinois, where survival was found to be 66 percent, considering all types of trees, all types of climate and spoil and all degrees of experience and lack of experience in planting and caring for stands. Average income over a 40-year cycle is estimated at \$3.71 an acre, based on species planted and prewar lumber and post prices (\$5 per thousand board-foot and 10c. per post). With the growing importance of cellulose in the nation's economic life, tons of wood chips may be the test and offer an increase of several times the yield.

Experience has shown that while turning over the ground brings up new supplies of minerals and results in other conditions favoring growth of vegetation all spoils are not the same. Therefore, for maximum results in tree planting or other use, spoils must be studied individually and planting adjusted accordingly. In Indiana large areas with a pH value of over 6.0 are devoted, along with unstripped margins, to pasture, after liming where needed. Small areas of a similar pH are planted with trees, while areas with a lower pH are planted with conifers. The operators are cooperating in research to develop further data on the character of spoil and its best use.

Cost of planting over the years has been highly variable. In Illinois, reported figures range from \$7.36 to

\$34.27 an acre, with the average about \$12.73 on the basis of 1,000 trees an acre on large plots. At the present time, considering tree and labor costs, good planting apparently can be had for \$20 to \$30 an acre—sometimes less, occasionally more—while annual revenue over a 20-year period should run \$10 an acre or more—probably more.

#### Leveling Slows Tree Growth

Leveling, experience indicates, is a detriment to the growth of trees and other vegetation. The packing and other effects of the use of machinery makes for less favorable results than if the spoils are left undisturbed, in the opinion of most experts. To further fit spoils for tree growing and other uses a number of operators find topping out with soft material and earth from the top of the bank quite helpful and report that taking the last two or three dippers from that position has no effect on output.

Except for some experimental plantings, fruit trees have not as yet been employed regularly in spoil reclamation. Although not especially singled out for care and in some cases left alone, some of these early plantings apparently offer promise for future developments. Consequently, it is expected that horticulture will find an increasing part in future reclamation work.

In view of the possibilities study has revealed for spoil banks, stripping companies now are going in for establishment of separate farm departments as paying ventures in themselves. One company's department, for example, takes over lands after reforestation and at present is studying the possibilities of not only wood production but also fruit, hogs and cattle.

Illinois offers several examples of stock-range development holding out

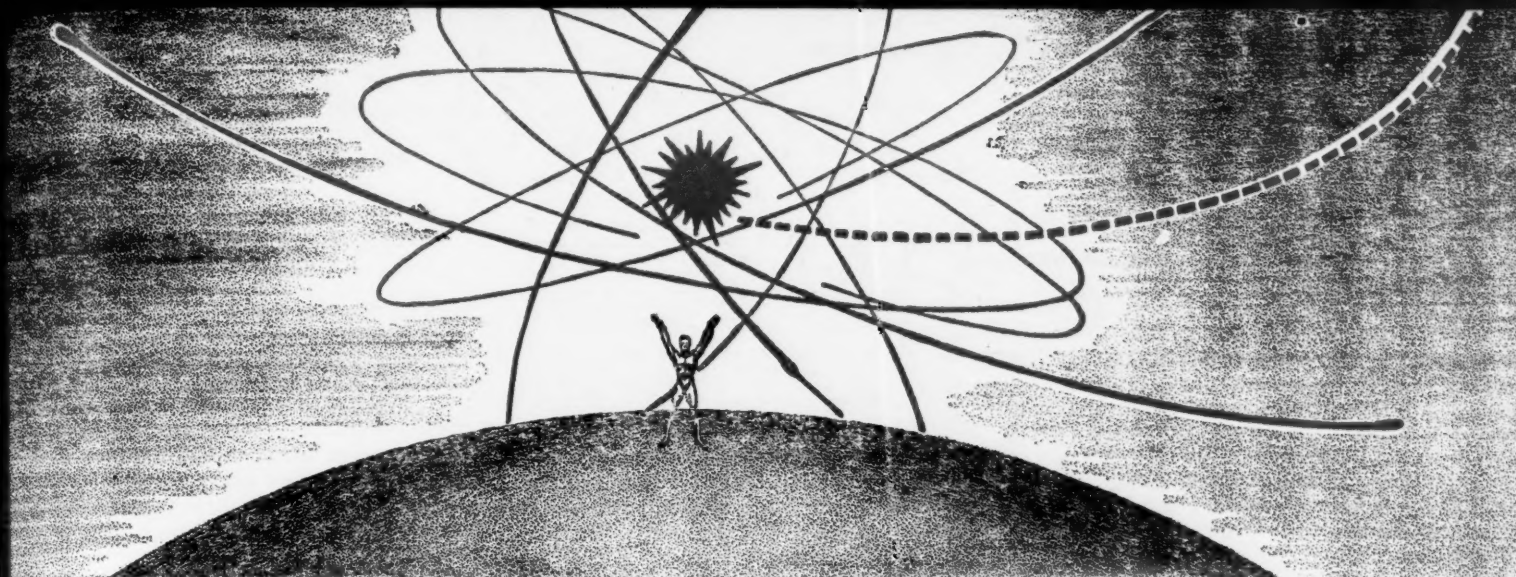
real promise. Experiments began some eight years ago and indicate that when the top soils are adaptable to such use the land will yield earlier and larger returns than perhaps any other form of reclamation yet tried. Topping with sweet or natural soils makes for even more favorable conditions for forage grasses, which grow lusher, remain green longer and are more nourishing than on land not disturbed. In one case, it was estimated that grass on regular pasture land adjacent to a strip planting grew 25 percent shorter.

#### Illinois Seeding Methods

Procedure is to first make a few access roads—and very few are needed. In one case, they represented a cost of about \$5 an acre. Then, the land is sowed with about 10 lb. of sweet clover per acre in the spring, which is permitted to grow about two seasons. Next, it is sowed with pasture grasses—about 8 lb. per acre. After a season, the land then is ready for heavy grazing. A number of Illinois operators have gone to airplane seeding, representing about \$2.17 per acre (\$1.67 seed and 50c. plane service) for the sweet clover seeding and \$3.49 for the pasture seeding (\$2.99 for seed). Total cost, including fencing of \$5, is reported to run about \$16 per acre.

Return on feeding cattle alone is reported at more than \$7 to \$8 per acre, as a result of a fattening rate for beef animals 25 to 40 percent greater than average pasture. One operator engaged in such a project reports that income since 1938 had been more than \$7 an acre—or more than the return from regular land selling for \$300 an acre. Hogs are to be tried and are expected to do well. Fur brings in \$1 per acre per year, or more than enough for taxes, while even bullfrogs are a possible source of additional revenue. As a result of the Illinois work, spoil banks are now in increasingly heavy demand, and will receive more study and work.

To sum up, spoil is an asset rather than a liability. In addition to recreational, wild-life and water-conservation possibilities, spoils offer an assured income from tree growth, while experiments to date hold out promise from a horticultural standpoint. In addition, experience also indicates that stock raising or feeding is perhaps even better than reforestation as a means of getting a good return in a minimum of time. Leveling and other uneconomical proposals are a detriment to the maximum realization from strip lands which, if studied, can yield real benefits without further work other than planting and collateral activities, it is evident as a result of the pioneering work of the strip operators themselves.



# MAN <sup>v</sup>s ATOM-YEAR 1

WHEREIN WE SIGNALIZE THE FIRST ANNIVERSARY OF THE ATOMIC AGE, CONSIDER THE ALTERNATIVES INHERENT IN BOTH GOOD AND EVIL POTENTIALITIES OF NUCLEAR FISSION, THEN VENTURE A GLIMPSE INTO THE FUTURE

**A** YEAR AGO, July 16, 1945, at Alamogordo, New Mexico, man created the first atomic explosion. Most impressive events diminish in stature as they recede in time. This one grows bigger with each passing day. It truly marked the beginning of a new age.

As Year 1 of the Atomic Age ends and Year 2 begins, we are engaged in three portentous projects.

At Bikini Atoll we are detonating the fourth and, possibly, the fifth atomic explosions in the history of the world.

At Oak Ridge, Tennessee, we are building the first atomic energy plant for peaceful purposes.

Most important, in New York we and all the other United Nations are engaged in the first attempt to subject atomic energy to international control. Literally, the fate of the world hangs on this attempt.

As this introduction is written, the United Nations Atomic Energy Commission has just begun its work. People everywhere pray for its success—for their own sake, but even more for their children and for their grandchildren. If this Commission fails let everyone everywhere be warned: the world has taken a step toward destruction.

As we enter the second year of the Atomic Age, the nations of the earth are embarked on an atomic armaments race. There is no blinking that fact. We have had official notice served on us. Therefore, we must understand that unless the United Nations Commission can

arrest the drift of events, we are moving toward a horrible war. The Commission must succeed.

The American delegate, Mr. Baruch, has brought to the Commission an ably thought-out plan. It would internationalize nuclear science, and release for mankind the beneficent applications of atomic energy. But it would "control" atomic bombs only to the extent of giving the world brief warning of any nation's preparation to use them, so that we might have foreknowledge of disaster.

Therefore, the real and enormous task before the world becomes clear. We must end war. No other control of atomic weapons exists. If war comes, atomic weapons will be used. If they are used, our children who survive will curse their fathers. Understanding the consequences of failure, we *must* succeed.

Because we cannot succeed without knowledge, I have asked my associates at McGraw-Hill to condense into the following pages what we know at the close of Year 1 about this great new atomic force—its basic science, its possible uses and its political repercussions.

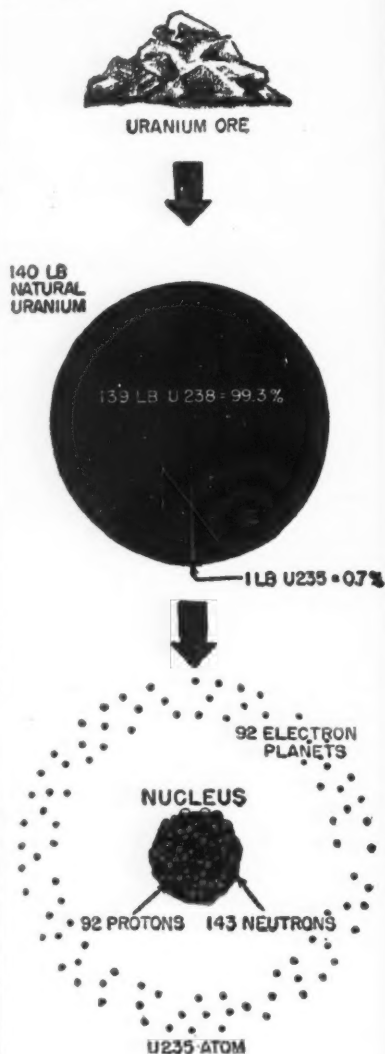
*James H. McGraw, Jr.*

President, McGraw-Hill Publishing Co., Inc.

# This Fateful Atom...

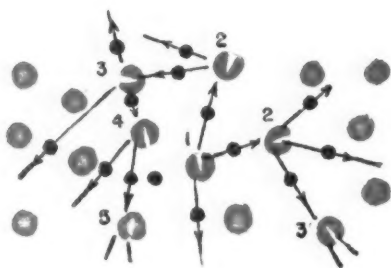
## 1 ORE TO U235

Only 0.7% of natural uranium is U235



## 2 CHAIN REACTION

Fragments from earlier nuclear explosions smash other nuclei



LOOKING BACK twelve months to the birth of Year 1, Atomic Age, we begin to sense the majestic import of the atomic bomb that blasted the naked desert at Alamogordo, N. M., on July 16, 1945. There man first shattered atoms in an explosive *fast-chain* reaction. Then came Hiroshima and Nagasaki.

In every case the fateful atom was either uranium 235 (U235), or plutonium derived from the action of U235 on U238. Every pound of U235 atoms split in these unprecedented blasts yielded the energy of 11.4 million kilowatt-hours, or 1400 tons of coal—slightly more for plutonium.

No matter where one mines uranium ore, the purified natural uranium (Fig. 1) always contains 99.3% of the "garden" variety U238, and a mere 0.7% of the precious U235.

An atom is like our solar system. The central sun is the nucleus—a bunched mass of protons and neutrons, each weighing one unit. The planets are electrons. Each proton has one plus electrical charge—each electron an equal negative charge. There must be as many negative electron planets as positive protons in the nucleus. This is also the "number" of the atom. Neutrons have no charge, but add weight.

The atomic number of uranium is 92 because the uranium atom always has 92 nuclear protons and 92 electron planets. The isotopes U238 and U235 differ only in the number of neutrons; U238 has 146 neutrons, and weighs  $92 + 146 = 238$  units. U235 has 143 neutrons, and weighs  $92 + 143 = 235$  units.

Ordinary chemical reactions, such as TNT explosions, release only a fraction of

the modest energy of the whirling electrons in the outer atom. Nuclear reactions unlock the immensely greater energies which bind together the nucleus.

Even the gentle tap of a slow-moving neutron bullet will split the atom of U235 or of man-made plutonium into two medium-weight atoms, yielding also one to three spare neutrons plus energy. Thus these *fissionable* materials supply both their own bullets and a highly sensitive lot of high-explosive targets—a perfect setup for a *chain reaction* (Fig. 2).

Chain reactions work like chain letters. Neutrons from one nuclear explosion hit and explode other nuclei. But, since atoms are mostly open spaces a chain started in a small block of U235 or plutonium quickly dies out because most of the released neutrons escape from the block.

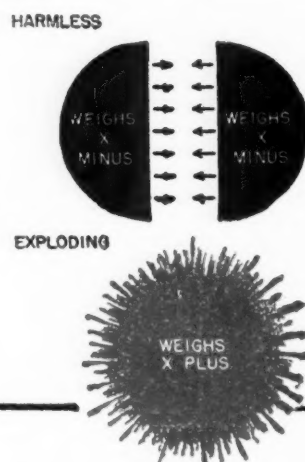
The bigger the block, the smaller will be the percentage of escaping neutrons, and the more left to split other nuclei. When the block is rapidly built up beyond a certain secret size the fragments of 1000 nuclear fissions split many more than 1000 additional nuclei. Then fissions multiply geometrically, and the block disintegrates with explosive speed and violence—as in a bomb (Fig. 3).

This bomb explosion is a fast-neutron chain. For economy and ease of control, uranium piles for the gradual release of nuclear energy for commercial purposes will normally use a lean fuel—that is U235 or plutonium diluted with U238, thorium or other less costly materials.

To maintain a chain reaction such piles must be large and artificially stimulated by using carbon blocks or some other *moderator* (Fig. 4) to slow many of the neutrons. Slow neutrons make more hits than fast neutrons because there is more time for them to be swerved from a straight path by the attraction of nearby nuclei, as shown below.

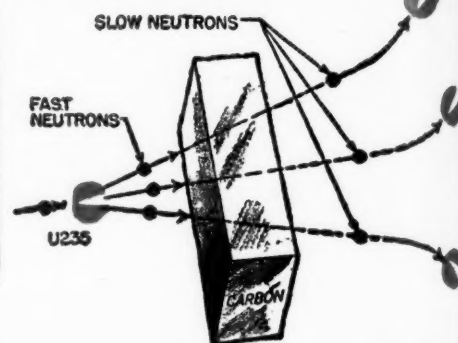
## 3 WHY BOMB EXPLODES

When block of rapidly assembled U235 passes secret critical size it explodes spontaneously



## 4 SLOW NEUTRONS MAKE MORE HITS

A slow neutron is more easily swerved from a straight line



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THE FATEFUL U235 ATOM can serve man as a new, compact source of heat energy for power generation, comfort heating or industrial processing. Peacetime applications of atomic energy will use dilute U235 or plutonium as a "fuel," mixed with carbon or some other moderator to slow some of the neutrons and thus keep the chain reaction going.

The diluting agent may be either U238 or thorium, or both. These will do double duty, because neutron bullets convert U238 into the energy-yielding plutonium, and thorium into U233, which may prove equally serviceable.

Thus the commercial piles of the future will "burn" U235 to make other atomic fuels, plutonium and possibly U233, which in turn will deliver heat energy to the pile. In that way it will be possible to get from the pile far more heat than the equivalent of 1400 tons of coal for each pound of U235 split. This highly attractive prospect will speed the day when nuclear energy can compete with coal.

While already mechanically obsolete, the piles making plutonium for bombs at Hanford, Wash. (Fig. 1) reveal the basic principle on which future piles for power and heat will operate. The heat now wasted in vast quantities will be put to work. The plutonium, now removed for bomb manufacture, will be returned to the pile (or left in) as supplementary fuel.

## ATOMIC POWER

The possible everyday applications of nuclear heat pictured in Fig. 2 have been recognized from the very first day of the Atomic Age. Year 2 will see the building of the world's first atomic power plant (a pilot plant) at Oak Ridge, Tenn.

Beyond question such installations will produce power, but it may be years or decades before they prove economical. To compete with conventional plants the piles must first be redesigned to run at temperatures high enough for good power-plant efficiency. Also the techniques of operating piles by remote control through the heavy radiation screens must be radically streamlined.

The Hanford piles run on natural uranium containing only 0.7% of U235. The typical commercial atomic power plant of the future will use more than 0.7% of U235 or plutonium, but less than 50%. This will avoid both the low efficiency of the too-lean mixture and the excessive fuel cost of the rich mixture. It will permit piles of moderate size and take maximum advantage of U238 and thorium as potential sources of plutonium and U233.

One should not expect U235 to replace coal generally in this generation, although a few central power stations and ships will

try it out before Year 10 of the Atomic Age. Plants far from traditional sources of fuels may turn much sooner to uranium and thorium as concentrated heat sources, that may easily be transported even to remote corners of the earth.

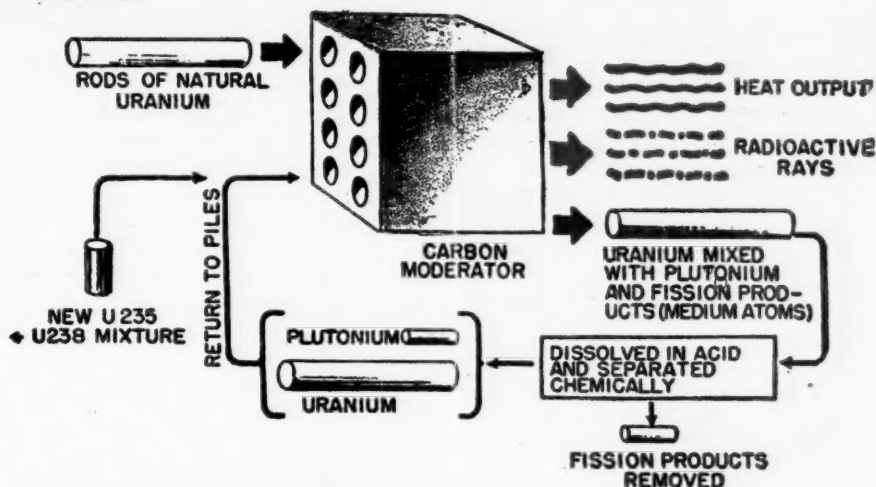
Atomic power, in forms now known, is impracticable for automobiles and small airplanes, because of the large initial investment in uranium and the need to carry 50 tons of shielding to protect riders and pedestrians against the deadly radioactivity accompanying nuclear fission.

## RADIOACTIVE ISOTOPES

More immediately important than the heat and power applications of nuclear energy are the services that the radioactive byproducts of pile operation can render. Because these materials act chemically like their ordinary non-radioactive cousins, but can be followed and detected easily, they are expected to play tremendously vital parts in medicine and biology. For more details, see the last page of this section.

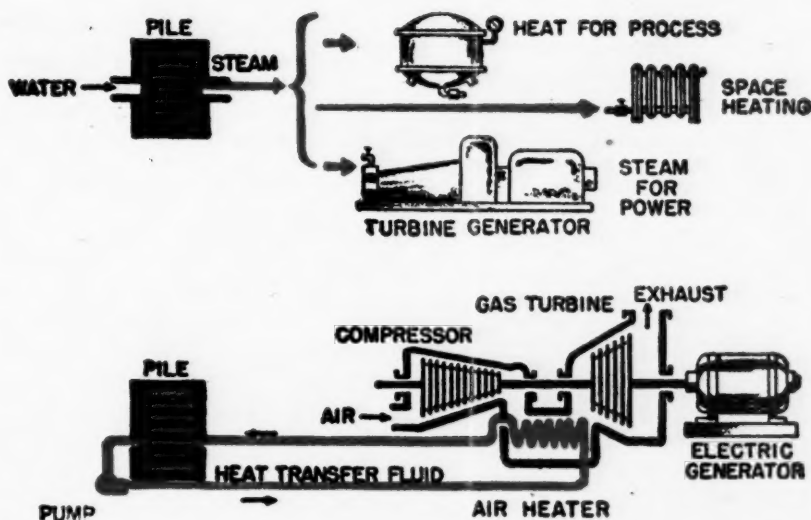
## 1 SLOW-NEUTRON PILE

Can make plutonium for bombs—or heat for power, process and comfort



## 2 PRACTICAL APPLICATIONS

Include steam for turbines, process and comfort heating—also heat for gas turbines



# or Destroy him . . .

**U**RANIUM 235 and plutonium are now man's slaves. They will build or destroy as he orders. Man dreads this vast force only because he distrusts himself. War is proof that man in the mass has never achieved self-control. He has always sought better weapons; yet the perfect weapon now brings him no satisfaction for he sees in the atom bomb his own destruction as well as that of his enemy.

The ultimate benefits of nuclear energy may well surpass its present terrors, but the terrors are here now in awful dimension, and man must face them. He must pay this price for unlocking the wealth of the inner atom.

## ATOMIC BOMB

This page, then, is about the atomic bomb. Nothing will be said here that is not either a certified scientific fact or a conclusion shared by the majority of the leading scientists, engineers and statesmen who have studied the matter.

As already explained, an explosive nuclear chain reaction spontaneously sweeps through a block of U235 or plutonium when the block is rapidly enlarged beyond a certain "critical" weight X. That weight is still a military secret; the official Smyth

report vaguely suggests that it is more than 4 lb and less than 200 lb. Each piece of U235 in the dormant bomb must weigh less than X. At the desired instant of explosion the bomb mechanism assembles these pieces rapidly into a single piece considerably heavier than X.

The explosion itself drives the U235 pieces apart, thereby quenching the atomic conflagration before all the atoms are split, so the bomb efficiency is far less than 100%. For each pound of U235 (or plutonium) atoms actually split, the bomb releases the energy of 1400 tons of coal.

This explosion is mainly ordinary heat at work in unprecedented concentration. Bomb metals become incandescent vapor millions of degrees hot. This, and the enveloping sphere of glowing air, radiate a blinding flash that chars human flesh at half a mile and blisters at over a mile. There is a destructive shock wave (sound) and a second-long hurricane of unimaginable force — the outrushing of the expanding heated air. Deadly neutrons and gamma rays speed out from the bomb.

A single atomic bomb killed about 100,000 at Hiroshima. Fewer died at Nagasaki only because the circle of potential destruction included much vacant land. Bombs ten times more powerful can be made by the thousands in any major industrial country with the plants and the know-how. One bomb could saturate Minneapolis or downtown Manhattan.

Many experts estimate that a complete set of American atomic "secrets" and blueprints might save a foreign power two to three years at best in its race for atomic arms. With no help at all from us, any advanced industrial nation can, in five to ten years, acquire the raw materials, the plants, the know-how and enough bombs to knock out the big cities of any other country overnight. In Year 2 of the Atomic Age this arms race is already on.

It will not fail for lack of raw materials; every country has lean ores worth working for bombs.

## THE CHEAPEST DEATH

Cost need not deter, for the atomic bomb is by far the cheapest method of destruction ever devised. General H. H. Arnold estimates that atomic bombs can be manu-



A single improved atomic bomb can devastate ten square miles of city

factured and delivered for less than \$500,000 per square mile of destruction.

Don't be misled by the two billion dollars America spent on a project that dropped only two bombs on the enemy. New plants can be built at a fraction of wartime cost, and the investment spread over thousands of bombs, not just two.

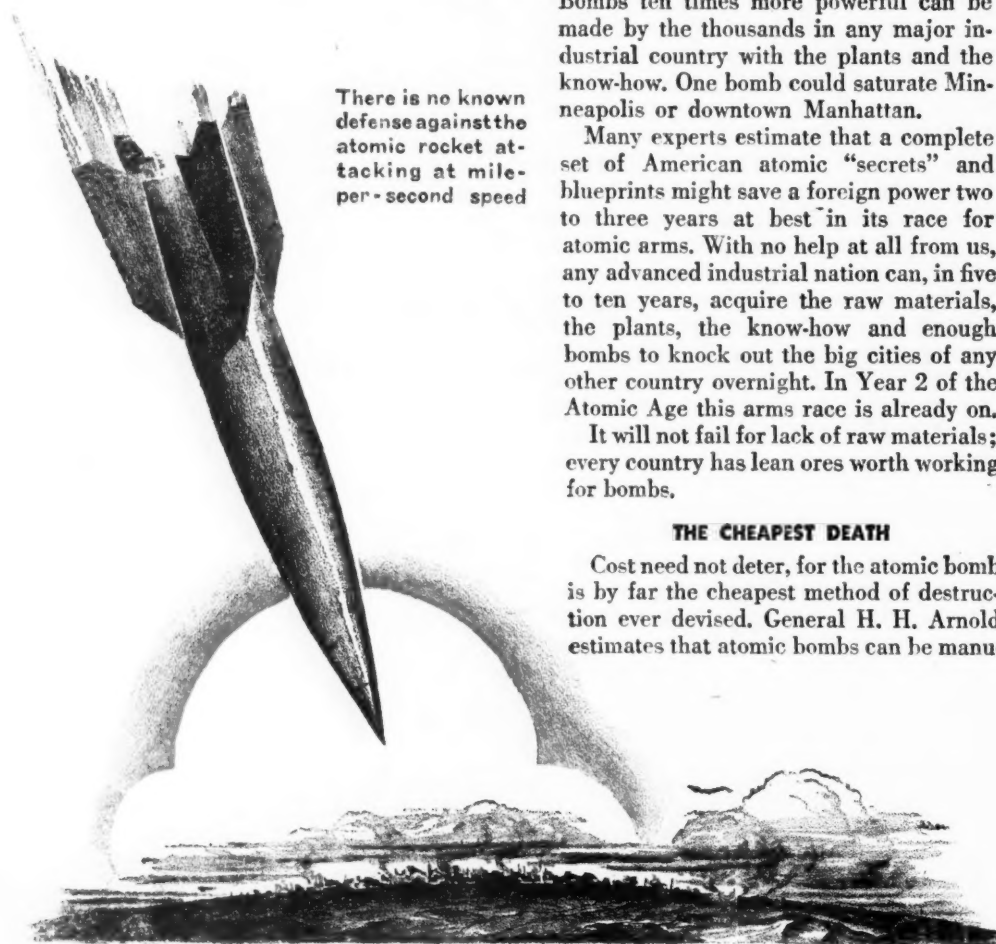
## NO DEFENSE

So the bombs can be made in ample quantity and paid for, but can they be delivered? The answer is: "Yes; by the time the bombs are ready they can be delivered anywhere and overnight." If the defenses of the target country are weak, piloted planes can get through in ample number. Ten percent would be enough.

For more effective delivery radio-steered pilotless planes and rockets can carry the atom bombs faster than sound. Such weapons will be almost untouchable by either antiaircraft artillery or manflown fighters.

Greatest threat of all will be the transoceanic rockets. The German V-2 rocket, which never once was stopped by Britain's defenders, points one way. It needs only transatlantic range (with atomic propulsion) and an atomic bomb in the nose. Forty-six feet long, loaded with 7500 lb of alcohol fuel and 11,000 lb of liquid oxygen, the V-2 of World War II rose 60 miles in the air and arced 200 miles in five minutes to deposit one ton of TNT in London.

Seeing so many strange things come to pass, the man in the street cannot distinguish between possible miracles and the impossible variety. From the very start of the Atomic Age he has been hoping for a "ray" that will explode the atom bomb far off. Competent scientists and engineers say that cannot be.



There is no known defense against the atomic rocket attacking at mile-per-second speed

The only way to bring down a 3500-mile-per-hour rocket at a safe distance is to chase it with your own 4000-mph rocket. You can't win at this game often enough to establish ironclad protection.

The only specific defense against the atomic rocket known in Year 2 of the Atomic Age is to disperse all cities and put key industries underground. This would be very costly in time, money and national morale.

#### MORE AND BETTER BOMBS?

Some will ask whether the U.S., as the most powerful industrial nation, could not build more and better bombs and carriers than any other nation. Probably yes, but there is still no real security. If the "weak"

opponent has enough atomic weapons to destroy us once, what advantage is there in being able to destroy him twice?

Shooting first could protect us now, but not after the world is atomically armed. If we were to destroy the enemy's cities, we would probably miss his well-concealed and protected bomb magazines and rocket launchers. A few minutes later he could return the atomic fire. In brutal simplicity, that is the picture of future atomic war. Everybody loses.

At this point one grasps at another straw: "If everybody is to lose who would be so foolish as to start an atomic war? And didn't the Germans refrain from using gas for a similar reason?" Possibly yes. It may work that way. But in a world

atomically armed to the teeth some nervous finger may pull the fatal trigger.

#### ONLY ONE WAY OUT

Throughout history each new offensive weapon has called out its appropriate defense. But now the offense leaps centuries ahead in a single bound and the defense lies almost helpless everywhere, unless some technical protection, unknown as Year 2 begins, can be devised.

The situation is extremely dangerous. There is no clear way out except through some sort of international action first to stop the atomic arms race and, before it is too late, to hobble war itself.

Can it be done? Perhaps not, but there is no alternative except atomic chaos.

# ...so he faces the Atomic Dilemma...

THE NUMBERED statements that follow in somewhat logical pattern are too fateful to be accepted on anybody's say-so. Every reader should test them in the light of his own information and understanding.

The points below sum up the conclusions of the previous article — and these in turn reflect a great mass of thought and discussion among leading scientists, engineers and statesmen close to the problem. To an amazing degree they concur on both facts and conclusions. For authoritative statements of their line of thought, in detail not possible here, the reader should see the recent book, *One World or None*.

## THE DILEMMA

Nations must either face the probability of an atomic World War III, which would surely be the most deadly in history . . .

Or, the experts propose, yield both atomic weapons and war potential to international authority backed by superior force.

### What the Experts Say

1. In five to ten years any major industrial nation can make enough atom bombs to destroy all the major cities of any other country overnight.
2. This assumes no "secret" information or other help from us.
3. The necessary uranium ores will be at hand.
4. The cost will not be too high.
5. The bombs produced can then be carried thousands of miles by bombers, or by atomically powered guided missiles moving faster than sound.
6. There will probably be no effective military defense against such weapons.
7. Dispersing cities, and putting key industries deep underground, will give some protection if accomplished in time,

but at incredible cost in money and human discomfort.

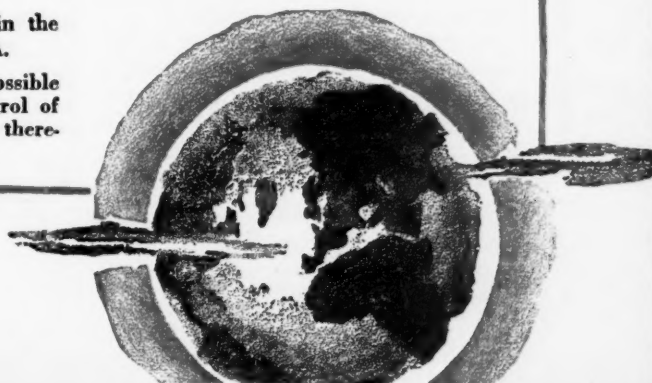
8. In a world atomically armed, nations can probably protect their bomb stocks and rocket launchers from enemy assault.
9. If so, nation A can destroy the cities of any other nation B, after which B's rockets will destroy the cities of A. Shooting first will not win an atomic war.
10. This knowledge may not restrain the trigger finger of a suspicious power.
11. Having more and better atomic weapons than the other fellow won't help much if he has enough to destroy us. No use to kill a man twice or rebomb urban ruins.
12. Every nation is vulnerable in the Atomic Age, including the U. S. A.
13. National security will be impossible without (first) international control of atomic arms and (not too long there-

after) international control of all war potential, both backed by superior physical power.

14. If action to this end is long delayed, it may become impossible to halt the atomic arms race already started.

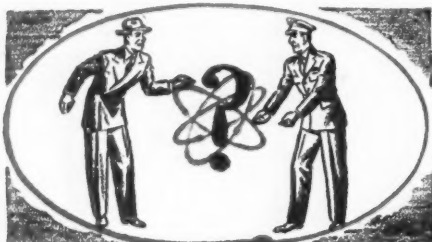
15. At best, the necessary degree of international control, with some real delegation of national sovereignty, will be a revolution in human affairs. It may prove to be humanly unobtainable at this time. If so, men and women everywhere must face the probability of an atomic third world war—by far the most destructive in all history.

In this atomic age no nation can be safe through its own unaided might



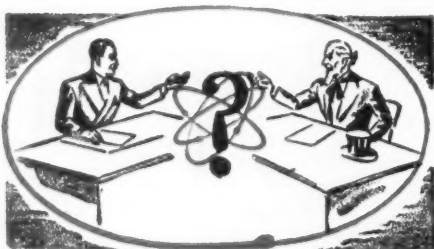
# ...and the Great Debate unfolds

**A**TOM YEAR 1 has probably been marked by more debate on a single subject than any other twelve months in the world's history. Social, economic and political as well as purely technical issues have been pressing for realistic solution. Let us look at these issues and see where we stand:



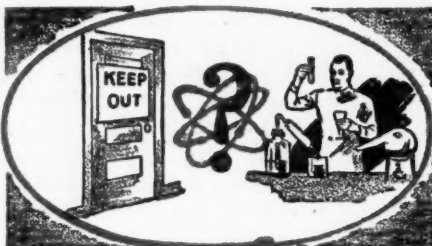
## CIVILIAN VS. MILITARY

Because the atomic bomb is the world's greatest weapon, the armed forces would like to control it. But because atomic energy can also be used for peaceful, beneficial purposes, civilian control seems equally essential. These conflicting viewpoints had their strong proponents before the Congress which finally reached a fairly satisfactory compromise in the Atomic Energy Bill of 1946, setting up a competent civil board with which the armed forces will have continuing liaison. As we go to press, just before Year 2 of the Atomic Age begins, this bill has passed the Senate, but there is still a question how rapidly it will be enacted into law.



## PRIVATE VS. PUBLIC

Atomic energy is "too big" and "too hot" to be handled privately. It must be nationalized and internationalized. The questions are *how* and *to what extent*. Fortunately, as the "boxes" on these pages show, there are means that may attain reasonable safety against misuse of the atom, and still do so without public control of many "non-dangerous" applications,



## SECRECY VS. FREE SCIENCE

Throughout the first year of the Atomic Age hot debate has raged around "keeping the secret of the bomb." To prevent potential enemies from making atom bombs some have urged a complete black-

out of all phases of atomic energy — even of the scientific fundamentals of nuclear physics. Others have sought immediate and complete disclosure of all bomb "secrets," both scientific and technological. These have held that such information cannot be effectively hidden, that secrecy blocks progress and breeds wars.

A year of debate has brought the great mass of vocal opinion to this middle ground: (1) Ease restrictions on the exchange of basic physical knowledge. (2) Release for industry's benefit many of the devices and methods developed for the bomb project. (3) Hold tight to specialized information on atomic bombs and bomb-material production until international safeguards are fully operative.

## DOMESTIC CONTROL AS PLANNED IN THE ATOMIC ENERGY BILL OF 1946

*McMahon Committee Bill contains the following provisions.*

**Policy.** Declares it the policy of the U. S. to develop and utilize atomic energy to improve the public welfare, increase living standards, strengthen competitive enterprise and promote world peace.

**Organization.** Establishes the Atomic Energy Commission (AEC) of five administrators to direct four divisions on research, production, engineering, and military applications—to work in liaison with three committees from (1) the armed forces, (2) outstanding civilians, and (3) joint Congressional representatives.

**Production.** AEC to own and operate (under management contracts with industry if deemed desirable) all facilities for the production of fissionable materials, such products to be distributed with their radioactive byproducts under license for private industrial and medical research.

**Military Application.** AEC to engage in development work and produce atomic bombs as directed by the President, to be delivered only on his order to the Armed Forces.

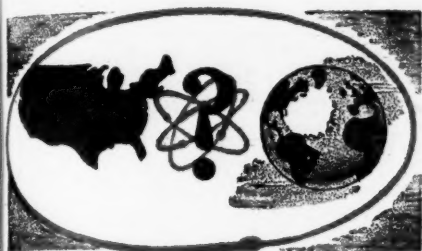
**Industrial Utilization.** Permits AEC to conduct research, design and manufacture equipment for atomic-energy utilization, license its use, produce and sell power obtained as a byproduct in the production of fissionable materials. Directs AEC to give widest safe scope to private initiative.

**Control of Information.** AEC to enforce a ban on the dissemination of restricted data that might be used to injure the U. S. or secure advantage to a foreign nation, yet to provide leeway for ultimately relaxing restrictions as future conditions warrant.

**Patents and Inventions.** No private patents permitted for production of fissionable materials or their utilization for military weapons, but AEC will justly compensate for such inventions, when made by private citizens. Patents for non-military applications may be purchased or condemned by the AEC only when public interest is affected.

**Appropriations.** "Such sums as may be necessary and appropriate to carry out the purposes and provisions of the act" plus unexpended funds of the Manhattan Engineer District.

# while Time runs out



## NATIONAL VS. INTERNATIONAL

Born of nationalism, the Atomic Age began when three nations discovered a weapon that today gives them the greatest military power on earth. The prime question is: Shall the atom remain the

servant of its conqueror, nationalism?

During Year 1 of the Atomic Age the Truman-Atlee-King declaration, the masterly report of the State Department's atomic consultants, and the U.S. representative on the United Nations Atomic Energy Commission, have all called for international control of atomic energy. Year 2 will start with no such control. This failure to decide and act is in part a natural result of the extreme difficulty of the problem and the obvious dangers of unwise decisions. Nations everywhere face a triple dilemma in this Atomic Year 2: the dangers of nationalism, the dangers of internationalism, the supreme danger of not being able to make any decision in time to meet the atomic bomb threat.

## INTERNATIONAL CONTROL AS PROPOSED BY THE U.S. TO U. N. ATOMIC COMMISSION

*Baruch statement follows constructive path laid out by Atomic Consultants in "Acheson-Lilienthal Report."*

**The Plan.** The U. S. has proposed that all nations band together to outlaw the use of atomic energy for war and to promote and harness its development for the benefit of mankind. To this end an International Atomic Development Authority would be set up, and to it the U. S. would turn over, at various stages of its organization, all atomic bombs, know-how, raw materials, facilities, and stockpiles of fissionable material. Thus IADA eventually would supersede national authorities on some matters and supplement them on others.

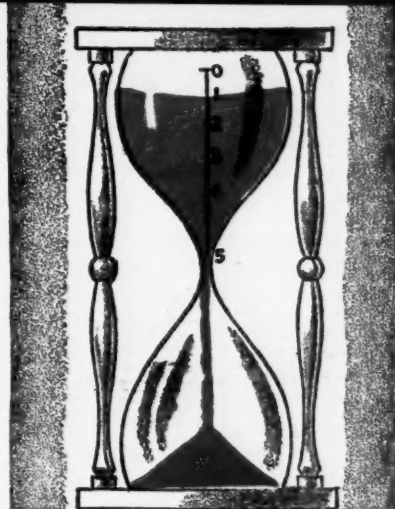
**Owner and Operator.** IADA would take over from national authorities or private ownership full management and control of all atomic energy matters that afford a possible threat to World security. These include:

1. Raw Materials—Supplies of uranium and thorium to be inventoried, controlled, and developed by IADA.
2. Facilities—IADA to control and operate plants producing fissionable materials and to own and control their products.
3. Research—IADA to undertake research and development on all aspects of atomic energy and to possess exclusive right of research on atomic explosives.

**Private Initiative.** Will have its chance to push forward the use of atomic energy for peacetime (non-dangerous) purposes. With IADA providing raw materials and carrying out necessary inspection, national and private enterprise may operate "safe" power piles, and produce and use radioactive isotopes for research, clinical and other applications. Radioactive isotopes produced by IADA also can be distributed for peacetime use.

**The Mechanics of Safety.** No plan is a certain guarantee against future atomic war. This plan should, however, prevent surprise attack with atomic weapons; for IADA is to buttress positive ownership or management controls with wide powers of inspection. Obviously, successful inspection rests on complete freedom of access or egress in any area.

**Sanctions.** At the heart of the plan lies the problem of penalty for violation—a matter for profound statecraft. To the U. S., one aspect of sanctions appears crystal clear: Here is an area where the veto right now held by the five great Powers must be redefined if it is not to be incompatible with the meaning and purpose of the proposed control.



Leading industrial nations can produce atomic bombs in five years, competent scientists announced after Hiroshima. Already one year of the precious five has been consumed in debate without international action. Soon it may be too late to check the growing momentum of the atomic arms race.

## TIMETABLE—ATOM YEAR 1

1. July 16, 1945. World's first atomic bomb detonated in New Mexico.
2. July 26, 1945. President Truman and Prime Minister Churchill issue Potsdam ultimatum threatening Japan's destruction if she continues.
3. August 6, 1945. Atomic bomb dropped on Hiroshima.
4. August 9, 1945. Atomic bomb hits Nagasaki.
5. August 11, 1945. Army releases Smyth Report on "Atomic Energy for Military Purposes."
6. August 14, 1945. Japan accepts terms of Potsdam declaration.
7. November 15, 1945. Truman-Atlee-King issue declaration of intention and procedures looking toward international control of atomic energy by United Nations.
8. March 28, 1946. State Department issues Acheson-Lilienthal Report on the "International Control of Atomic Energy."
9. April 12, 1946. Manhattan Engineer District announces program for experimental development of atomic power.
10. June 1, 1946. "Atomic Energy Bill of 1946" passes Senate unanimously, is referred to House of Representatives.
11. June 14, 1946. First meeting of United Nations Atomic Energy Commission (Bernard Baruch as American member). Manhattan District announces availability of radioactive isotopes for research use.
12. July 1946. Joint Army-Navy tests of atomic bombs at Bikini.

# ...but if Man Masters Atom.

**I**F MUTUAL DESTRUCTION by the atomic bomb can be avoided, the first century of the atomic age will bring immense advances in scientific knowledge, health and living standards. Already many prospective benefits can be outlined, but those we can neither foresee nor suspect may be even more important.

This prediction is grounded in scientific experience; the most fundamental discoveries have always been the most fruitful. The study of molecules gave us chemistry. Faraday's experiments with electricity and magnetism are the foundation stones of the great electrical industry. Can one expect any less from an understanding of the heart of every atom?

## BENEFITS

Atom-splitting benefits clearly visible today fall mainly in three classes: (1) heat and power applications of the uranium piles; (2) general industrial applications of equipment and methods originally developed for the bomb project; (3) chemical, biological and medical uses of the "tagged atoms" (radioactive isotopes) now abundantly available from pile operation.

It is now evident that the energy yield of the U235 in an atomic pile can be multiplied many times by returning to (or leaving in) the pile the plutonium and possibly the U233 produced respectively from the U238 and the thorium in the pile. This is an indirect way to "burn" inexpensive U238 and thorium, and thus greatly extend the supply and reduce the cost of atomic fuels.

## POWER APPLICATIONS

Although present piles run at low temperatures, it is certain that temperatures high enough for the efficient operation of steam and gas turbines will be attained. Already an experimental atomic power plant has been ordered. Atomic power for certain remote installations (say, for heating Arctic airports) may not be far off.

In five or ten years uranium piles will be driving a few experimental ships and submarines. In 20 or 30 years uranium may begin to compete widely with coal as a fuel for suitably situated large central heating and power plants. The 50-ton minimum weight of shielding rules out nuclear power for automobiles and small piloted planes.

## SPECIAL USES

Some day ultra-high temperatures from splitting atoms will be used for special industrial operations on metals and other materials. Even the dread atomic bomb might easily serve peaceful ends — blasting lakes in deserts, changing the course of rivers, leveling mountains.

## INDUSTRIAL BYPRODUCTS

The special industrial equipment and methods developed for the bomb project will find hundreds of important uses — mostly for purposes unrelated to atomic energy. These developments include pumps with neither seals nor leaks, leak detectors of amazing sensitivity, ultratight welding, a portable mass spectograph for quick and automatic gas analysis, new ways of handling corrosive and poisonous materials, new diffusion barriers for the separation of gases and of petroleum products.

## TAGGED ATOMS

Yet more important than any of these, in the long run, will be the hundreds of radioactive isotopes now available as by-products of pile operation. Chemically indistinguishable from the ordinary forms of the elements, these isotopes serve as tagged atoms or "spies" if mixed with common stable atoms of the same species. They "fly with the flock," and can later be identified as surely as banded birds. With these amazing tools of research, the course of any element or compound may be traced through the bodies of men, animals and plants. Similarly, tagged atoms

may be used in studying the course of many kinds of industrial and chemical operations.

## BIOLOGY AND MEDICINE

A suspected hyperthyroid condition can be diagnosed by feeding the patient a minute measured amount of radioactive iodine. The click of a "Geiger" counter placed on the patient's neck will tell (1) what percentage of the swallowed iodine concentrates in the thyroid cells and (2) how rapidly that concentration is accomplished — giving a definite indication of the state of the gland.

In similar fashion the radioactive isotopes of hydrogen, oxygen and carbon will trace out the intricate transformations of carbohydrates and proteins in the human body. Radioactive phosphorus will explore the bones. Radioactive iron will show how and where blood cells are formed. Radioactive sodium will time the circulation of blood.

## USES IN INDUSTRY

In chemistry the radioactive isotopes will speed the understanding of metallurgical and organic reactions. In industry they will measure flow, detect leaks, and do other useful work.

Meanwhile the uranium piles will be manufacturing certain radioactive isotopes that can serve as cheap but effective substitutes for high-cost medical radium.

## KNOWLEDGE COMES FIRST

It is already clear that the chief benefits of atom splitting will come first as new scientific knowledge rather than as new engines and gadgets. But in the long run man's new understanding of the inner atom will enrich the whole range of human activity. This has always been the case with less fundamental discoveries in science. It can hardly be less with this most fundamental discovery.

## ATOM SPLITTING WILL SERVE MAN IN:

### CENTRAL POWER PLANTS



### GIANT BLASTING OPERATIONS



### MEDICAL DIAGNOSIS AND TREATMENT



### SHIP POWER PLANTS



### BETTER INDUSTRIAL PROCESSES



### RESEARCH TECHNIQUES

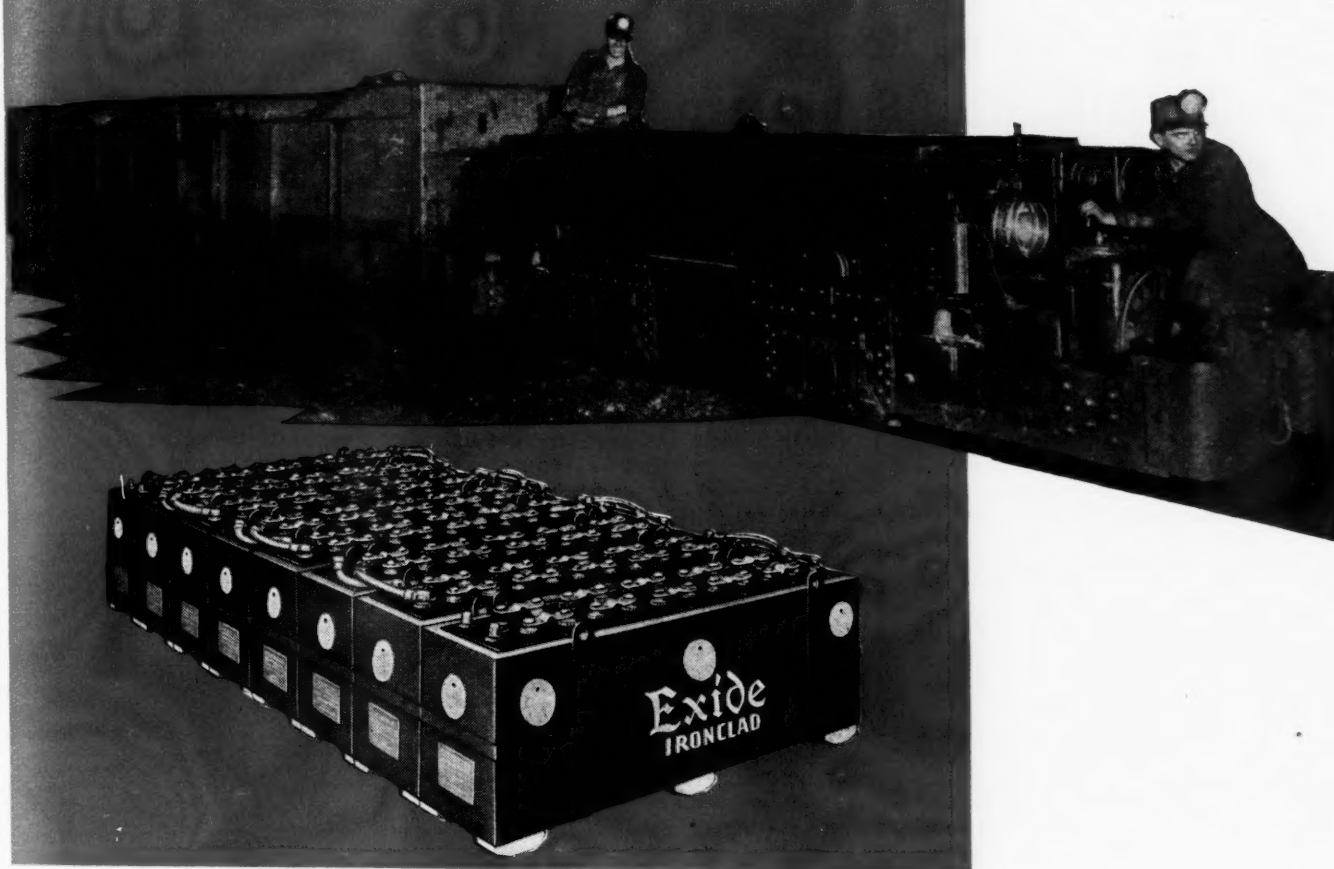


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# The Foremen's Forum

## Hunting for Loose Rocks: How to Make Roof Safe Despite Them

***In Some Mines, Kettlebottoms Never Fail to Reveal their Presence, but in Others Only When They Fall Can They Be Discerned—Bad Roof Usually Keeps Bad Company***

IF KETTLEBOTTOMS, niggerheads, inverted rolls, pots and skillets in the mine roof always could be detected, they could be taken down or duly posted and would be much less menacing than they now are. In some districts and in some beds, such irregularities in the roof rock are readily observed, others are not so clearly visible. Some safety men assert that they are found only in certain of their coal roofs and not in others.

**Loose Rocks Should Be Removed or Supported**—Many, if not most, companies and inspectors require that the presence of the irregularities, if noted, be entered in the examiner's book and all require that they either be barred down promptly or kept in place by the immediate erection of posts or crossbars. Learning how to identify them when they can be identified should be part of the duty of every mine official and employee, but reliance should be placed rather on the sounding of the roof.

### Like a Flat Rimless Cap

**Kettlebottoms**—The meaning of this much abused word, by which too many of these loose erratics in the mine roof are designated, is never quite clear. The expression often is used indiscriminately for all rock masses that are not of a piece with the normal roof and tend to fall. D. M. Harr and M. F. Spruce, in their annual reports for the first and second districts of West Virginia respectively for the year ended June 30, 1891, define a "kettlebottom" as "a piece of slate that drops out of a smooth cavity in the roof of a mine" when the coal beneath it has been removed. It loosens and falls without giving any warning. Fay's Glossary adds that a "kettlebottom" is the same as a "horseback" and gives "kettleback" as an alternative form. One of the wholly diverse definitions of "horseback" is "a piece of slate, flat underneath, thick in the middle and running out to a thin edge upon each side." This is a definition applied to certain occurrences in Arkansas and Kentucky.

**Nature's Compost Pile**—Quite often the expression "kettlebottom" is applied to a

mass of vegetation mixed with sand and soil that has been brought into being by a flood, coalified during eons of time by the pressure of debris and by heat, hardened by siliceous liquids, wide at the bottom and sloping in a roughly cone- or dome-like shape toward the top of the mass and frequently covered against the main roof with slickensided clay. Consequently, such kettlebottoms have little, if any, attachment to the solid roof, and it is remarkable how some of them remain in place as long as they do.

**Kettlebottom Bases Are Off-Color**—They tend to stain rock, if rock is immediately under them. Therefore, be suspicious if the surface of the roof in places is off-color. Kettlebottoms in a roof with "rashings" (masses of coalized fossil leaves, twigs, bark, nuts, seeds and other forest offal—attritus) are not easily distinguished, for the rashings are themselves of kettlebottom material, though not thus piled into a heap. If they are of hard rock they really are not kettlebottoms at all and may show no stain. Where a little of the top coal in the bed is left in the roof, its presence completely hides the kettlebottom without supplying enough strength to keep it in place. However, discoloration may reveal its presence. Because the kettlebottom is a piece of ossified forest rubbish, its shape as seen in the roof frequently is irregular; not circular but lobed like a dumbbell or figure eight or some other irregular shape. Its very shape is revealing. Rock shapes usually are not so gracefully curved.

### Built Itself Up on the Bog

**How Kettlebottoms Were Formed**—Some kettlebottoms are relatively light, being largely impure coal, but others are heavy by reason of the presence of large quantities of pyrite and sandy material. They are especially dangerous when they are made of leafy deposits and of the branches of trees that have been covered and infiltrated with sandy and clayey detritus. This covering hardened and formed a solid rock over which more rock later formed.

The vegetation, however, below this covering material contracted inordinately in hardening into coal and so drew away from the rock, leaving a place for the infiltration of a slickensided clay coating, and sometimes also even for an air space. Some of these kettlebottoms have as their central mass the stump of a tree, decapitated and sometimes overthrown, the tree dating back to the period when the coal bed was laid down. The nomenclature is not well established, so that the same occurrence will have a different name in different fields.

**Niggerheads and Pendentives**—Niggerheads should be hard. Some contain mostly siliceous material; some iron carbonate. Any use of the name to designate roof material that is not hard is misleading.

Sometimes, in Montana, the underside of the roof has extremely hard "pendentives"

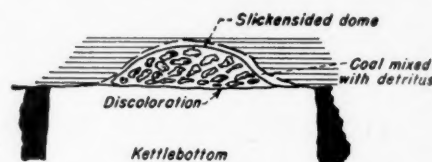


FIG. 1

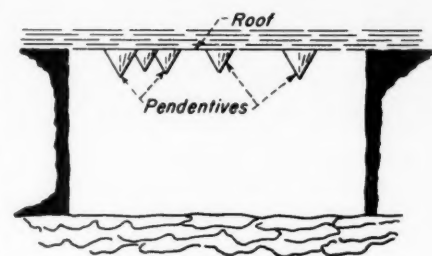


FIG. 2

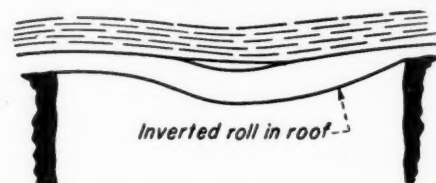


FIG. 3

A typical kettlebottom—Coalized attritus with sand covered with a layer of fireclay gouge. Pendentives—Hard rocky protuberances from the roof like a cow's teats but much larger. Quite an unusual occurrence. They ring when struck but sometimes fall out. Inverted Rolls—Stream replacements; probably the site of an ancient stream in the top of a coal bog. Later the stream silted and rock resulted.



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or "teats" that hang down from the roof some inches and even at times a foot, almost like stalactites but more truly round in horizontal cross-section. How they have been formed is not at all clear. In some places nothing will jar them loose, and they will ring when struck. At others, they will fall if support is not provided.

### Stream Fills and Footmarks

**Inverted Rolls and Dinosaur Tracks**—Some find much trouble with the "inverted rolls," which probably is not a satisfactory term to use in describing what appears to be a bulge or lowering of the roof into the coal. These might be more aptly termed "niggerheads" or "horsebacks" because they are hard, or they might be designated "stream replacements" because it would appear that a stream washed a channel in the coal and sand filled up the waterway.

In the Cretaceous period, dinosaurs—"terrible lizards," to translate the word literally, walking on their hind legs—made deep tracks in the coal bogs from which coal was later formed. The tracks filled with sand; the sand hardened into rock, which usually knits well with the roof above, and makes little trouble, but sometimes these casts fall out. The tracks, however, are readily seen. In Carboniferous times, there were no animals of such size or physical development, and no such tracks are found.

**Bad Roof Keeps Bad Company**—Some rocks that reveal weakness when sounded are nevertheless strong enough to furnish partial and temporary support to other rocks. It always is well to examine carefully the roof under which the man will stand when he is scaling down the rock he knows to be dangerous. Perhaps the rock over him is being supported by the very rock he is trying to scale down, and if so, it may fall when the rock he is scaling is broken away. It is always well to remember that the roof has some degree of integrity and that when it is broken, other rock may have been loosened and will have to be brought down.

Before the rock that is the object of scaling has been barred down, the rock around it should be tested and after the objective rock has been displaced, another examination of the surrounding rock should be made, for scaling may have to be extended.

**Is This Fatigue or Increasing Stress?**—In any working place, too much faith should not be placed in the rock in the room road. Time may free or mining may stress the rock so that it will be ready to fall, for all the stress is not at the working face, nor is all the deterioration and fatigue. In fact, stress and strain increase as the face advances and spans accordingly grow longer. The rock may break over the coal seam also and, when the rib is scaled or entered for making a room or a safety station, this rock may fall without warning.

## Systematic Timbering At Working Face

Nearly 50 percent of all the deaths and injuries in the coal mines occur at the face—that relatively small space which, in the length and breadth of the nation, comprises

in all only about 800 acres, says Richard Maize, secretary of mines, of Pennsylvania, in the *National Safety Council News Letter*. It is in this restricted danger zone, that most of the roof-fall injuries occur. Strange as it may seem, many well-meaning persons believe that, in this same zone, the miner should be allowed to rely on his own judgment and be held responsible for his safety.

No one's judgment, or even caution, should be regarded as a substitute for a safety device or system. To the mere judgment of any individual, security of human life cannot be left with safety. In our big cities, gold is transported from bank to bank in an armored truck. No banker would so rely on the judgment of an individual that he would feel safe if he dispensed with this needed safeguard. No less should effective safeguards always be thrown around human values and protection from falls of roof be assured by a systematic timbering plan.

Who can say that among the thousands of workers killed and injured in our coal mines, some of the victims suffered only from a failure to exercise their best judgment for all accidents are unplanned, unexpected and unintended. Might it not be better, and more practical to guard by some system against this physical cause of injuries. When once this precaution has been taken, there will be less need to instill, in the minds of workmen, sufficient fear of consequences that the constant thought of avoiding accidents will be implanted in them. To introduce a larger measure of safety in the danger zone indicated, establish a timbering system and insist that it be followed.

## Little Water Vapor In Cold Air

At low temperatures, air refuses to retain or absorb water, as is shown by Fig. 1, where the quantities of water in gallons added to 100,000 cu.ft. of saturated air for each degree of increase in temperature as vertical measurements (ordinates) are plotted against degrees of temperature as horizontal measurements (abscissas). It will be seen that these quantities rise from 0.014 gal., when the temperature is -20 deg. F., to

0.757 gal. when the temperature is 90 deg. F., a ratio of 1 to 5.4.

It is very evident then that a heavy fall in temperature in outside air does not bring any great addition to the drying capacity of the air admitted to a mine if the temperature already is low. If it added as much drying capacity per unit fall of temperature



Fig. 2—The vase analogy shows how the water absorbed per degree of rise of temperature varies with temperature.

at points below 0 deg. F. as it does at 60 deg. F., the mines in the winter would indeed be dry and dusty. Extremely low temperatures add little to mine dryness.

Fig. 2 is based on a vase analogy. Here the horizontal distances at the several temperatures are plotted not according to the number of gallons per degree rise in temperature but according to the square root of that number because the several linear lengths, being plotted as diameters of circles, have to be of such lengths that they will be proportional to the square roots of the several changes in gallons per 100,000 cu.ft. of air per minute. This changes the curvature considerably and also changes the ratios from 5.4 to 1 and makes them 7.3 to 1. The ratio of capacity for water vapor at 90 deg. and at -20 deg. F. is 89.6 to 1.

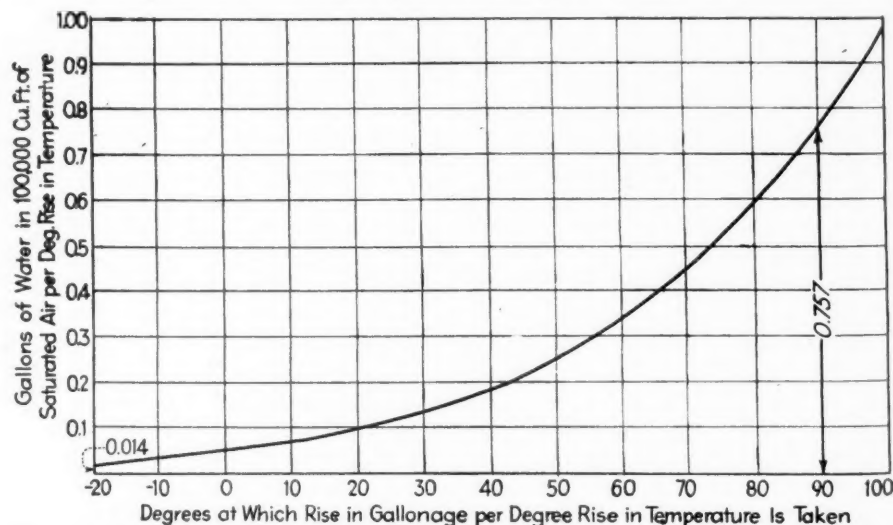


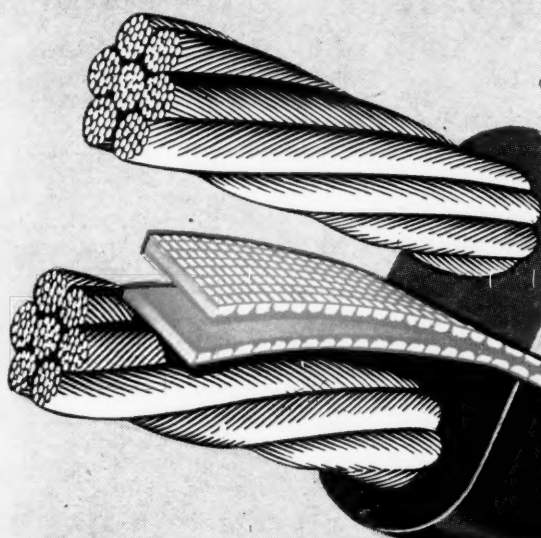
Fig. 1—Not only is there more water vapor in warm saturated air than in cold saturated air but the quantity of water absorbed by the air per rise of 1 deg. temperature is greater at high temperatures than at low. Saturated air at -10 deg. F. takes up little water as it rises to the freezing point.

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# State-Board Questions

## Mine Foremen, Pa., Bituminous

- Q.—(a) How would you ventilate the portion of a mine, of which the accompanying sketch, Fig. 1, is a map, using three splits, and keeping in mind that methane is being liberated from the rooms and the caved area adjacent to the 11th South and from all the developing entries?
- (b) Detail all violations of the law observable in the map, naming the headings in which they occur.
- (c) What is the pressure in pounds per square foot against the base of the barrier pillar left in place between the abandoned workings to the lower left of Fig. 1 and the 4th Flat and 13th North?
- (d) To comply with the law, what width of barrier pillar should have been provided? Show how you would calculate that width.

### Airing of Three Splits

A.—(a) To ventilate the portion of the mine shown in Fig. 1, alternative plans are shown in Figs. 2 and 3 respectively. (Some would be inclined to favor the construction of all side entries with either two or four headings so that equal cross-sections would be provided for intakes and return, and full advantage taken of the cross-sectional areas of all the headings, with no obstructions, other than checks, being needed for satisfactory distribution of the air.)

In Fig. 2, a large portion of 12th South (that between the two doors in that airway and for some distance beyond) is ventilated only by leakage or through the doors when they successively are opened. During a long period of idleness, as between working shifts, that length of heading may receive enough methane from the chain pillars on either side to become dangerously charged with that explosive gas, which the electric locomotive may ignite on entrance through the outby door. Or a charged and fallen trolley wire may ignite the methane.

### Doors Should Leak

However, some leakage can be deliberately provided through the doors, thus permitting only enough air to pass to clear away this small volume of methane, which, however, may constitute a high percentage, for the air volume with which it is mixed is also small. Beyond room No. 8 in 11th South, the air current may become perilously filled with methane from rooms Nos. 1 to 8, the air current having circulated in all those workings, and this air travels into the congested, and still caving, area and into 12th South beyond the doors in that heading, in which probably an electric locomotive is running and bare highly charged wires are strung.

On the other hand, in Fig. 3, which, however contrary to the query's provisions, has five splits, not three, the current sweeps uninterruptedly up 12th South except for checks to divert the air into the 11th South at the first crosscut. (A dangerous quantity of methane must be liberated in the old pillars or why, in Fig. 2, has direct ventilation been provided for sweeping the necks and side pillars of rooms Nos. 6 and 7, even though only the polluted return air from rooms Nos. 1-4 and also that from rooms Nos. 5 and 6 has been assigned to that task?)

### Open Road Helps Fan

However, by leaving that straight airway relatively free from obstruction, as in Fig. 3, the resistance of the split and therefore of the entire mine will be lowered, and so more air will be carried to all the workings and more air will be diverted to that particular split. Moreover, the electric locomotive will travel and wires will be strung in good intake air, not in stagnant air polluted by the irregularly and uncertainly removed methane from the pillars lining the 12th South, which is not properly ventilated even when one door is opened.

Moreover, in Fig. 2, the return air from 11th South is crossing 12th South a long way from the working places, and the electric locomotive may be recklessly driven into

this dangerously polluted air because the electrician may have failed to withdraw the trolley wire back to a point outby this crossing. Also if the wire falls, it may ignite the methane at that point.

### Don't Split The Return

In using the last east-side crosscut but one to carry some of the air from the goaf to the 13th South, it is not clear that any advantage is gained, and the disadvantage of having methanized air in the intake heading is clearly apparent. Why not block the opposing crosscut and continue to carry all of the air along the goaf to Room 9, and then return it along the inby end of the chain pillar lying between 11th and 12th South headings, then carry it, for a short distance along the 12th South roadway to the last west crosscut of that heading shown in the drawing?

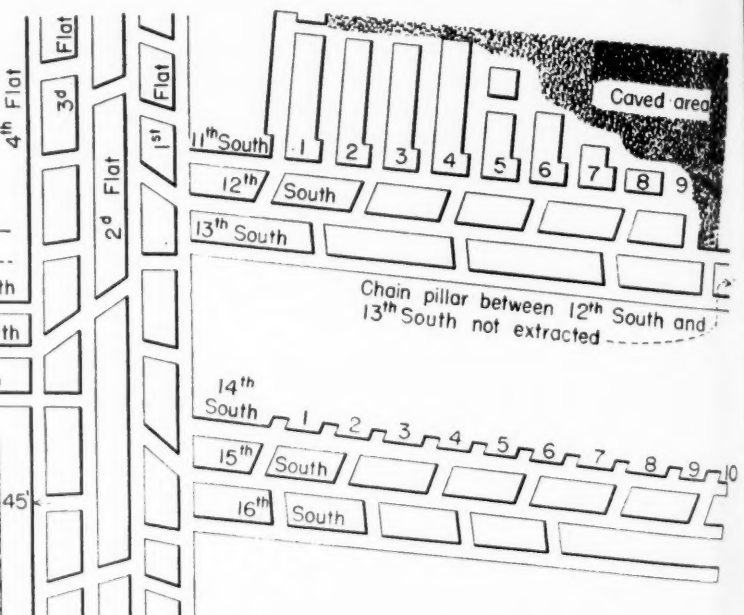
The chain pillar between the 12th and 13th South headings cannot be withdrawn inby the latter crosscut because in no effective way can air be introduced for its removal, though some may pass through the goaf and return by the 13th South heading bringing the methane with it. If that chain pillar is to be mined inby the last west-side crosscut shown in the drawing, it must be by driving rooms from the 14th South heading of the next South entry when that heading has been extended far enough to admit of the withdrawal. (Continued on p. 102.)

FIG. 1

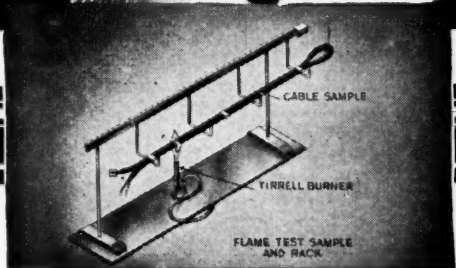
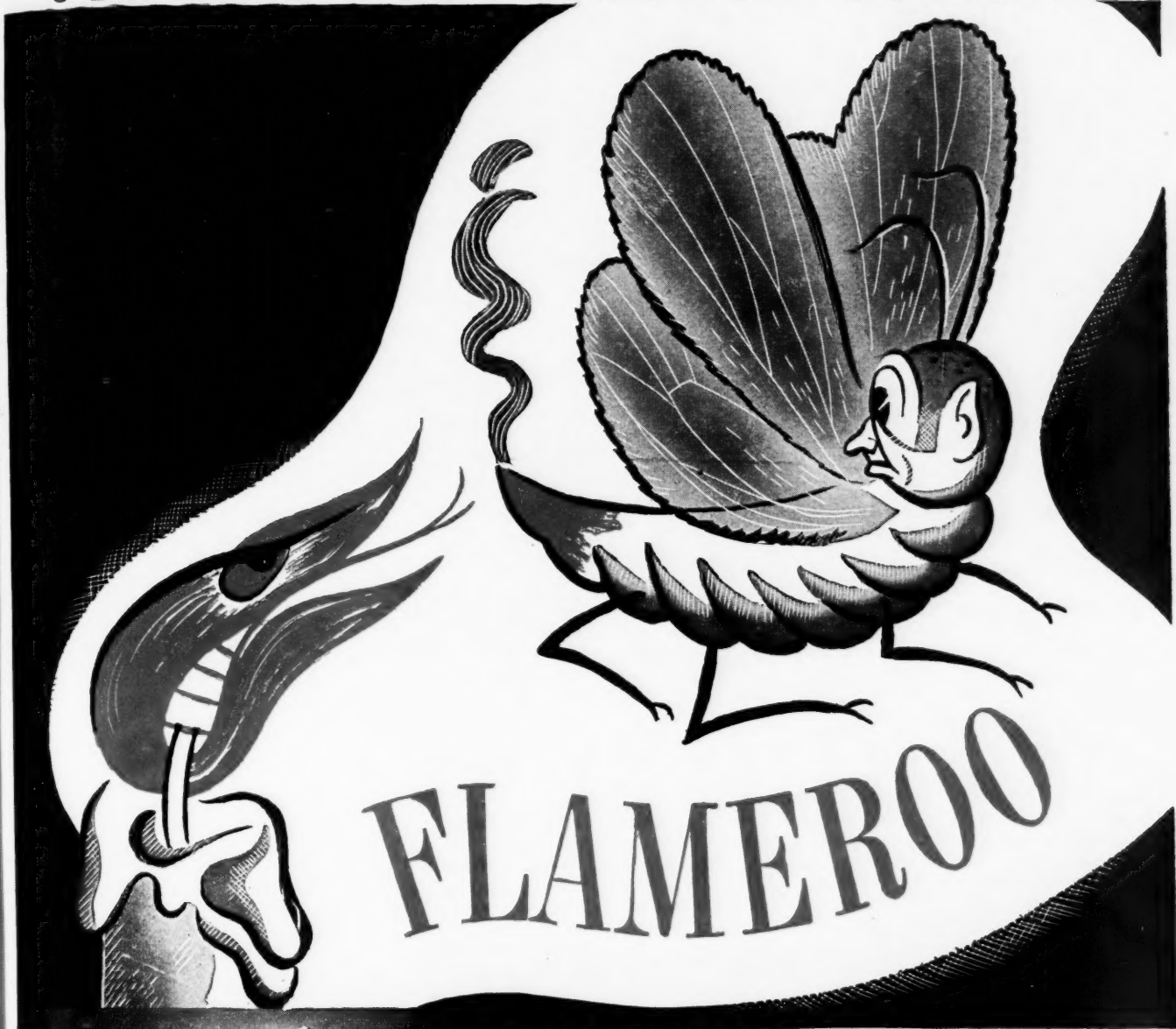
Use following symbols in making your reply: Check C

Regulator R  
Stopping II  
Overcast X  
Door Q  
Direction of air current —  
Line brattice - - - -

11th North  
12th North  
13th North  
45' Coal Thickness 6'  
45' Abandoned workings  
Mines water head against barrier 20'. Cover over coal 180'



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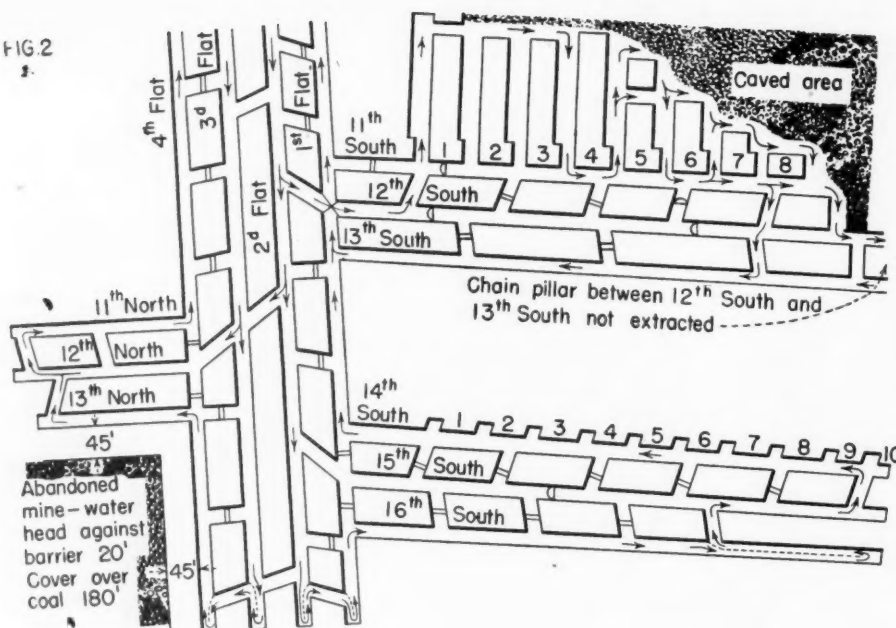
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FIG. 2



### Continuous Ventilation

Furthermore, in Fig. 2, the entry containing 14th, 15th and 16th South headings is ventilated by a current continuous with the air from the Flats, and so is also the entry comprising 11th, 12th and 13th North. The latter entry still is short, but soon will be long, and the former entry is already long, and neither should be ventilated by a continuous split, for each contains the methane from the ends of the two Flat headings which each comprise one of the two halves of the Main Flat entry, which are the more "fiery" because they are being driven in virgin coal. An inspector might well term the current in both returns as "return air."

Such continuous splits have the disadvantage that all the methanized air from one entry travels the roadways of another entry and there is, in consequence, little true intake air in the two side entries mentioned. A burst of flame at the face of the Flats, which headings, being in virgin coal, are likely to evolve much methane, would be almost sure to traverse the entries named, for no purer air is received on the way to those entries to dilute their methane content. Rooms eventually will be extended from the 11th North and 14th South, and both will receive air filled with methane, though presumably, when the rooms are so extended, the same treatment as in the entry of 11th, 12th and 13th South headings will be established in these entries also. The overcasts for these entries eventually must be constructed, so why delay their erection?

### How Law Is Transgressed

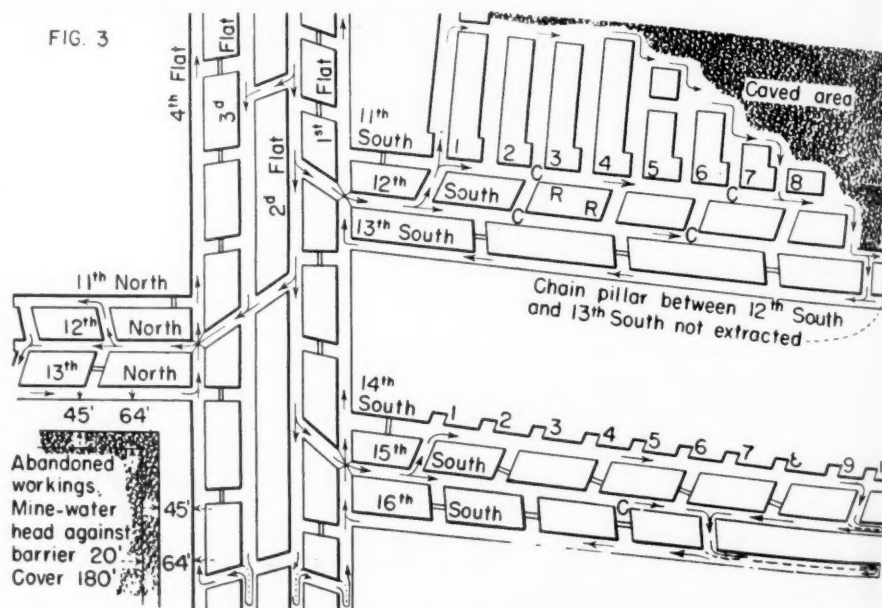
A.—(b) Violations of the law exhibited in Fig. 1 are: (1) excessive lengths of room without crosscuts, as can be noted in rooms Nos. 1, 2, 3 and 4; (2) also such excessive lengths in headings between 13th South and 12th South and between 16th South and 15th South; (3) the end of the 16th South heading is being driven without a crosscut well beyond the distance permitted by law; (4) the barrier pillar between the abandoned mine and both the 4th Flat heading and 13th North heading is deficient in width (as will be seen later); (5) a heading

is being driven in 13th North and 4th Flat less than 50 ft. from an abandoned mine which contains, it is stated, a dangerous accumulation of water; and (6) boundary lines are not indicated, workings in the adjoining mine are not shown, nor are elevations, numbers and dates of survey stations shown in the map.

The long pillars between the 2d and 3d Flats were driven presumably in pairs using an exterior heading in each instance as its return and with all crosscuts (but the last to be driven) bratticed off. Consequently, both logically and legally the distance between crosscuts in the interior headings is a matter of no consequence. Each interior heading is an intake, and each exterior heading is a return, and provision is made to connect both by frequent crosscuts between them; so that is the sole consideration.

Crosscuts between flats Nos. 2 and 3 would not serve any purpose except as traveling ways for men, electric locomotives and machines, and if any more were driven, they would not be helpful in ventilating the roadways but would rather hinder the ventilation

FIG. 3



by creating resistance, as openings in a roadway even though "blinded" by stoppings always do. They would also weaken the pillars on which reliance is placed for supporting the roadway headings. For these reasons, the infrequency of crosscuts in this and similar instances is to be commended, not criticized, as indeed has been generally recognized everywhere.

### Pressure on Barrier

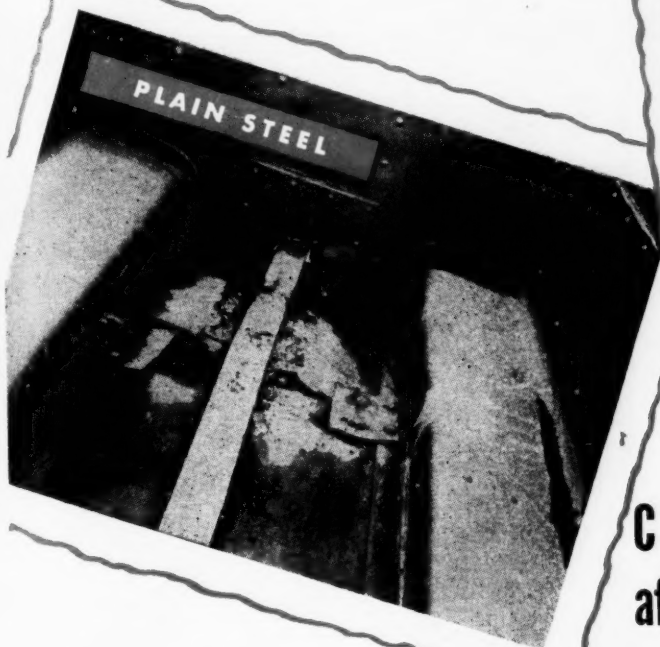
A.—(c) As water weighs 62.5 lb. per cubic foot and, as the map shows, there is 20 ft. of water in the abandoned mine, the pressure per square foot at the base of the barrier pillar is  $20 \times 62.5 = 1,250$  lb. Or, if it be recalled by the postulant for a mine foreman's certificate that the pressure of a foot of water is 0.434 lb. per sq. in., the pressure of 20 ft. of water will be  $20 \times 0.434$  and the pressure of 20 ft. of water per square foot will be  $20 \times 0.434 \times 144 = 1,249.92 \approx$  about 1,250 lb.

### Size of Barrier Pillar

A.—(d) In regard to the width of the barrier pillar, it should be recalled that the Pennsylvania Bituminous Law (Article III, Section 5) requires that each mine-property holder on either side of his boundary line shall provide a pillar 10 ft. wide (the minimum width regardless of conditions) plus twice the coal thickness for every foot or part of a foot of thickness from roof to floor, plus 5 ft. for every 100 ft. or part of 100 ft. of cover over the bed at the boundary line. In this instance, the cover is 180 ft. and as it exceeds 100 ft. and is less than 200 ft., in calculating the size of the pillar, it is reckoned as 200 ft. So the multiplier for 5 ft. is  $200 \div 100 = 2$ , not 1.8. Hence, minimum allowance is 10 ft., allowance for thickness of bed is  $6 \times 2 = 12$  ft., and allowance for depth from surface to coal is  $5 \times 2$  ft. = 10 ft. Summing up, total allowance for each property holder is  $10 + 12 + 10$  ft. = 32 ft. Total pillar allowance for both property holders is  $32 \times 2 = 64$  ft. Yet, in the map, it is only 45 ft., so that two legal requirements have been violated, the permanent barrier provision and the law of approach, as has been noted.

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"Our old equipment consisted of 3-ton mild steel cars, weighing 3500 pounds. These cars after 7 to 10 years service suffered severely from corrosion. (above left) Large areas of the cars scaled off. Many of the cars corroded entirely through the sides and

bottom and it was necessary to practically renew the bottoms and the lower part of the sides.

"In the fall of 1937 our mine was completely mechanized. This program provided for the replacement of all the 3-ton cars with 6-ton cars. Due to our past experience with excessive corrosion repairs on the old cars it was decided to have the new 6-ton cars constructed entirely with U.S.S. COR-TEN steel.

"100 of these COR-TEN cars were put into service in December 1937. They weigh 5290 pounds each, are streamlined, welded throughout, are very rugged for their weight.

"During the period from December '37 to April '39 we had three bad

wrecks with a mixture of old 3-ton cars and new COR-TEN cars. In every case, the old cars were severely damaged, some so much so that they had to be scrapped, while the COR-TEN cars suffered very little damage.

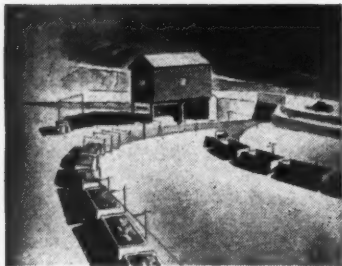
"Now, after eight years and two months service the U.S.S. COR-TEN cars show very little corrosion and practically no scaling. (above right)

"I am very well pleased with the service these cars have given us, and I feel that we can obtain an additional 10 years service or more without any trouble. I would recommend the use of U.S.S. COR-TEN steel and welded construction to anyone who is contemplating the purchase of mine cars for long service."

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United States Steel Supply Company, Chicago, Warehouse Distributors  
United States Steel Export Company, New York

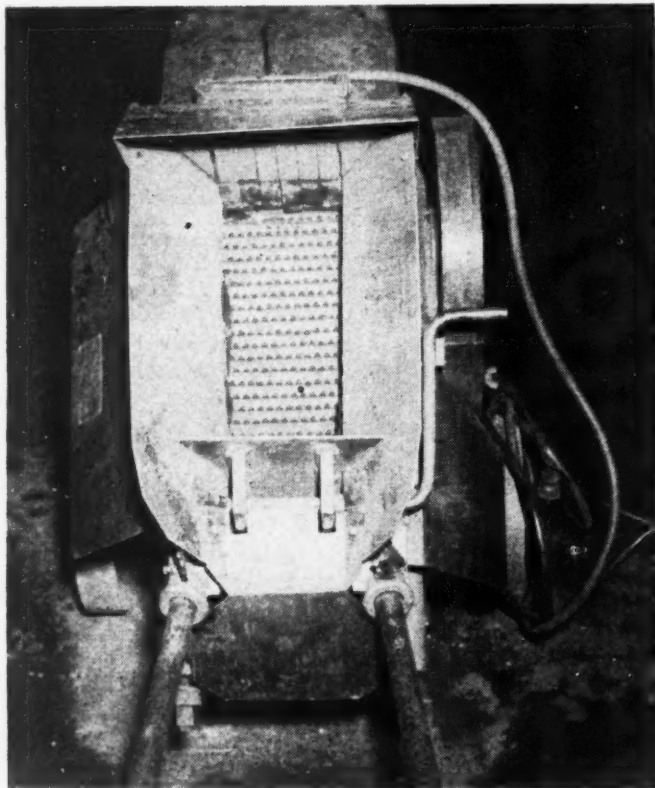


# UNITED STATES STEEL



# Operating Ideas

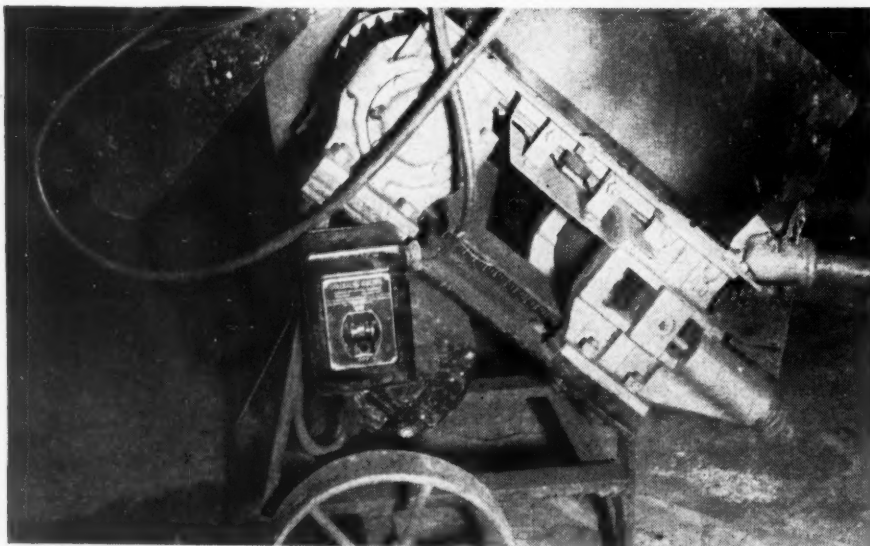
## Sand Conditioner a Help to Foundry



The flexible baffle is near the upper end of the belt conveyor.



The sand conditioning machine handles all that two men feed it.



A MOTOR-DRIVEN sand conditioner saves work for laborers and does a better job of conditioning the sand, observes John Stewart, foundry foreman at the Providence shop of The Hudson Coal Co., Scranton, Pa.

The Model NB-2 Rover foundry-sand conditioner, shown in the accompanying illustrations, can handle all the sand that two men can feed to it. The men shovel the sand onto a rubber belt (with rubber projections) which carries it past a flexible baffle and then discharges it in a fine spray to a heap either on the floor or into a bin. Changing the position of the hood deflector controls the distance the sand is tossed by the machine.

How the machine looks from the side with the apron raised.

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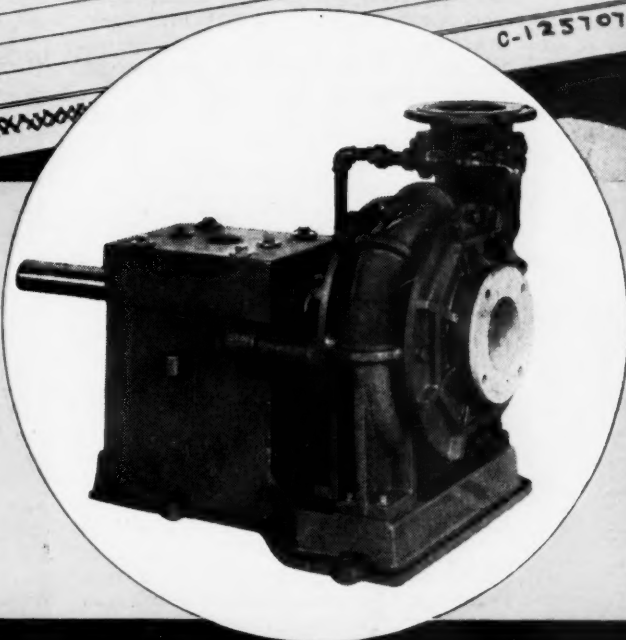
**PUMP INSTALLATION DATA**

C-125707 Date: 1/10/36  
 Customer: Agency N. E. Co.  
 Service: Classifier Overflow Pump Fr. & Type: 8-41-1  
 Serial No: NW409CUH  
 Size Material: 65 Mesh Sp. Gr. Solids: 3.4  
 Sp. Gr. Solids: 28%  
 Tons Solids/Day: 600 Ft. Pos. Hd: 3'  
 Suction Conditions: Suction: 6"-3'  
 Pipe Size & Length: Fric. Loss/C: 5'  
 Vert. Discharge Lift: 28' Est. Hd: 38'  
 Elbows & Valves: 2-90° Els. Pump Speed: 750 RPM  
 Motor Char: 1/2 HP-1740 RPM Seal Pres: 30#  
 Est. HP Req'd: 5.3 Act. HP Rec'd: 5.4  
 Drive: OHB-V-Belt Motor Pulley: 5.6" Pump Pulley: 13" Belts: 4-7B1

REMARKS:

Name of Customer:

C-125707



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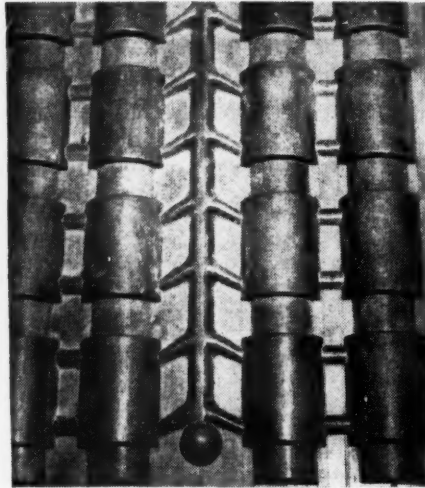
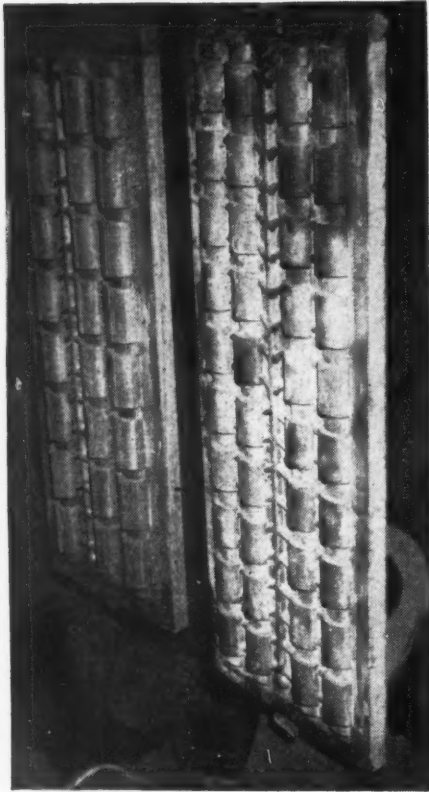
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## Pattern Makes 40 Journal Brasses

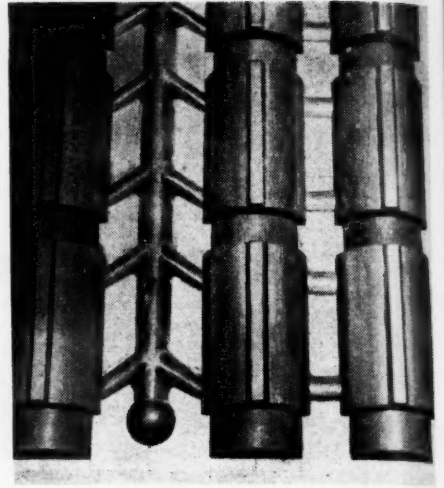


How the metal travels to the four rows of the pattern for car-journal brasses.

Patterns hang on hooks when not in use.

MULTIPLE-UNIT patterns speed up the production and cut the unit cost of journal brasses made in the foundry of the Drifton shop, The Lehigh Valley Coal Co., Drifton, Pa.

The larger patterns, shown in the accompanying illustrations, permit one mold to



In the pattern for locomotive-journal brasses, the gate running full length of the board, with feeders running backwards, insures a full flow of metal to every casting.

produce 40 car-journal brasses and another to produce 24 locomotive-journal brasses. Before, when the patterns were made for four units, more molds had to be made and the total number of journals made at one pouring was considerably less than the number now.

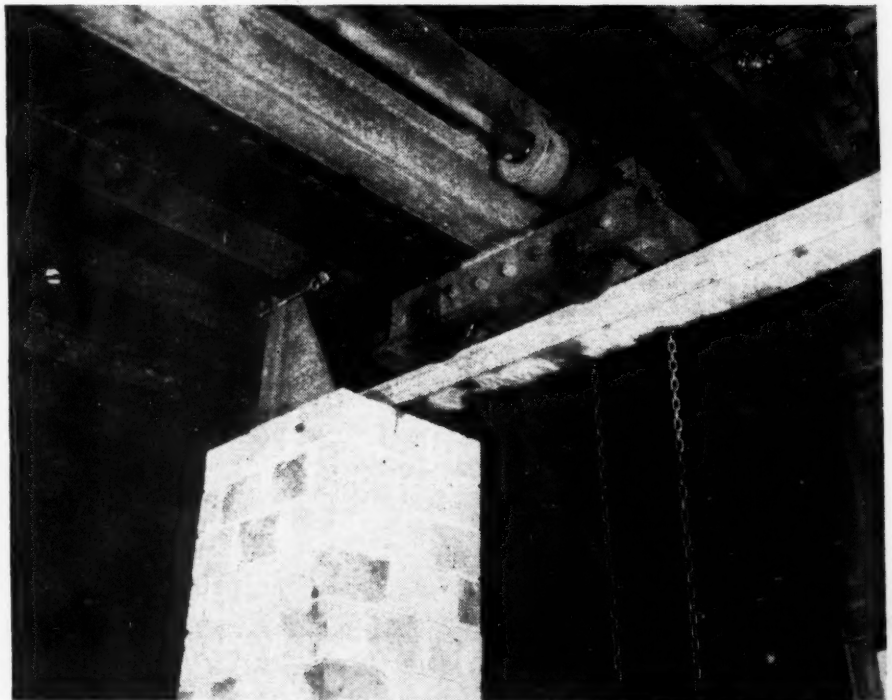
## Bridge of Shop Crane Moved by Roller and Steel Cable

NOVEL design of the bridge traction for the shop crane shown in the accompanying photograph brings to mind, "Where there's a will there's a way". This crane, made during the war from scrap or surplus materials at the mine, is in the motor shop of the Eastern Gas & Fuel Associates, Koppers Coal Division, Weeksbury, Ky. Charles Hamilton, chief electrician, devised the method.

The crane bridge is moved by a hand chain and pocket wheel taken from a scrapped chain block. Instead of the complications of gearing to connect the pocket-wheel shaft to the crane wheels, the traction is by means of a roller on the pocket-wheel shaft and that roller carries two turns of  $\frac{3}{8}$ -in. wire rope with its ends anchored at the ends of the runway and held tightly by a coil spring at one end.

Because the wire tends to travel endwise across the roller, the latter must be long enough to accommodate that travel. On this crane the roller, made from 6-in. pipe, is 13 in. between flanges. The trucks have roller bearing wheels taken from an old type WK26 portable air compressor which was scrapped some years ago.

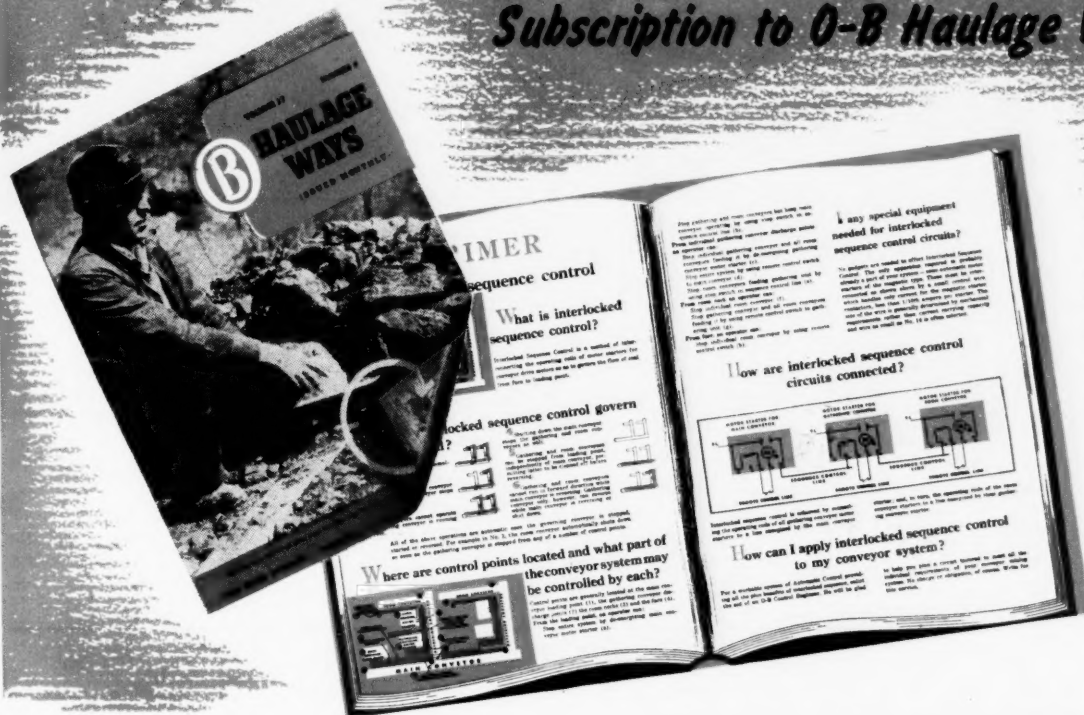
Span of this crane is 16 ft. and on its I-beam are mounted two trolleys. One is equipped with a  $1\frac{1}{2}$ -ton chain block and the other with a 5-ton block.



Drive of the bridge crane is a stationary steel cable with two turns around a roller 6 in. in diameter.

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## Thin Jam Nut Goes on First

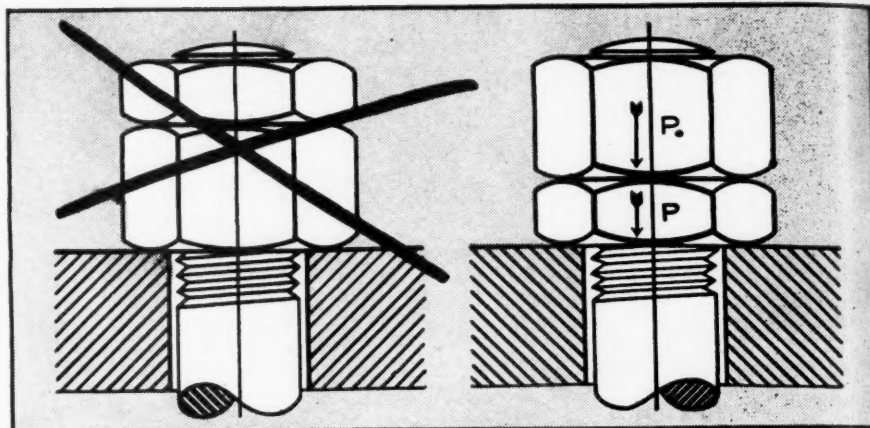
WHEN jam nuts are used, the apparently logical way of placing the nuts is incorrect, according to the American Institute of Bolt, Nut, and Rivet Manufacturers' publication, *Fasteners*. The thin nut belongs on the bottom and the thick nut on top as shown in the accompanying illustration.

The reasoning back of using the nuts in this order was analyzed in the three cases which follow.

Case 1 ( $P_0$  less than  $P$ )—Here the top nut has been tightened lightly in comparison to the bottom nut. Threads of both nuts are bearing upward in the same direction on the bolt threads. If the bolt tension is lost the threads of both nuts lose their bearing on the bolt threads and can vibrate free. Therefore, there exists no locking effect.

Case 2 ( $P_0$  equal to  $P$ )—In this case both nuts have been wrenched equally. The top nut bears on the bottom nut with the same force that the bottom nut bears on the work.  $P_0$  is equal to  $P$  and the difference in these forces, which is the load on the thread of the bottom nut, is zero. This means that the bottom nut is not bearing on the bolt threads in either direction. In this instance it is serving only as a plain washer and, therefore, it is not producing any locking effect.

Case 3 ( $P_0$  greater than  $P$ )—Under this condition the top nut is bearing down on the bottom nut with a force greater than



Left—The wrong way to try to secure locking action between two nuts. Right—With the thin nut on the bottom and the thick nut on top and with the force  $P_0$  exceeding force  $P$  there is locking action between the nuts.

the bottom nut bears on the work. The difference in these forces is the load supported by the threads of the bottom nut and is downward against the bolt threads. Since the threads of the top nut are bearing upward on the bolt threads, the two nuts are bearing in opposite directions on the bolt threads and therefore are jammed and locked to the bolt threads. This locking effect remains even if the bolt tension is lost. This is the only case where locking

occurs and since to arrive at this condition  $P_0$  must be greater than  $P$ , it is logical that the top nut, which produces the force  $P_0$ , should be thicker than the bottom nut. Threads of the bottom nut carry only the difference in  $P_0$  and  $P$ , which is relatively small.

In assembly, the thin nut should be put on with only a moderate torque and the thick nut should be wrenched on tightly with as full torque as it can stand.

## Fire Extinguisher Board Shows Use

TIPPLE FIRE EXTINGUISHERS			
No.	TYPE	LOCATION	OK
0	PYRENE	1 WASH BOX BLOWERS	
1	PYRENE	6 TIPPLE CONTROL PANEL	
2	PYRENE	6 TIPPLE BREAKER PANEL	
3	PYRENE	1 TIPPLE CIRCULATING PUMPS	
4	PYRENE	1 HEAT DRYER FURNACE	
5	KARD-ALOT	7 No. 63 RAW COAL SHAKERS	
6	KARD-ALOT	7 HEAT DRYER SCREENS	
7	KARD-ALOT	7 CLASSIFYING SCREENS	
8	PYRENE	1 OOMP SHANTY	
9	PYRENE	1 TIPPLE SHOP	
10	KARD-ALOT	7 TIPPLE SHOP	
11	PYRENE	6 PANEL SCALPING TABLE	
12	PYRENE	6 LOWER TIPPLE-BREAKER PANEL	
13	PYRENE	1 ELECTRICIANS SHANTY	
14	PYRENE	1 R.O.M. FEEDER	
15	PYRENE	1 PRIMARY SHAKER	
16	KARD-ALOT	7 No. 1 LOADING BOOM	
17	KARD-ALOT	7 No. 3 LOADING BOOM	
18	KARD-ALOT	7 PICKING TABLE	
19	PYRENE	1 No. 937 LARRY	
20	PYRENE	1 No. 885 LARRY	
21	PYRENE	1 D-40 BULLDOZER	
22	PYRENE	1 D-7 BULLDOZER	
23	PYRENE	1 No. 1 MINER	
24	PYRENE	1 No. 2 MINER	
25	PYRENE	1 MINER	
26	KARD-ALOT	7	
27	PYRENE	1	

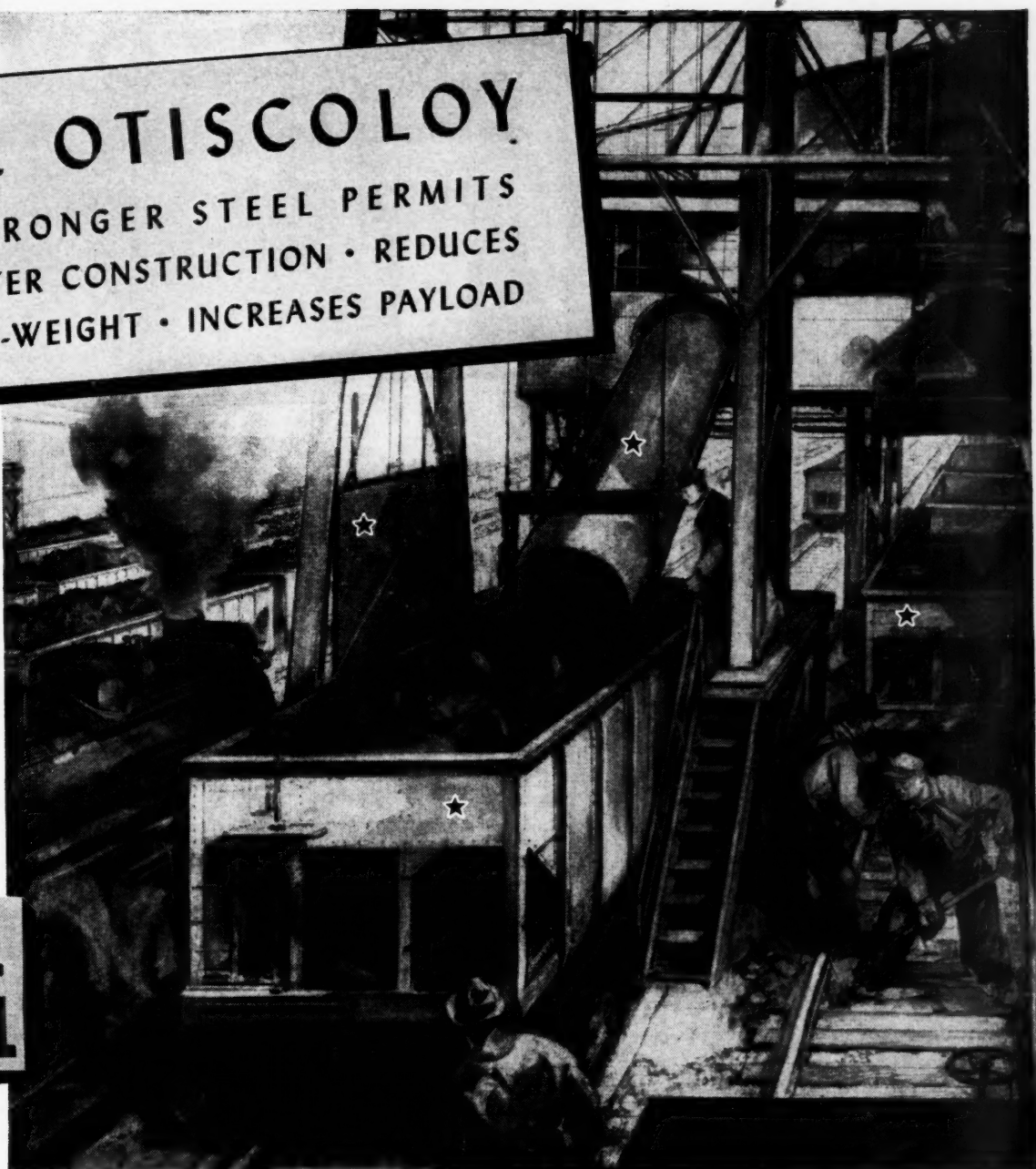
TO MAKE sure that fire extinguishers in the preparation plant serving Piney Fork No. 1 mine of the Hanna Coal Co., Piney Fork, Ohio, always are in condition for use, the extinguisher board shown in the accompanying illustration has been developed by Okey Howard Jr., tippie maintenance foreman. It will be noted from the accompanying illustration of the board that the location of every extinguisher is plainly listed. A check is provided for each one and when it is used the check is transferred to the "Used" column. The board is checked each morning and if an extinguisher has been used it is immediately replaced or refilled. Then the check is moved back to the "O.K." column to show that it is again ready for service.

Checks on this fire-extinguisher board show immediately when an extinguisher has been used.

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Otiscoloy is 40% stronger than ordinary steel. Its high strength is obtained without mechanical working or heat-treating which permits great workability. Otiscoloy is also resistant to abrasion and corrosion.

★ Otiscoloy is used in freight cars to reduce weight by as much as 5½ tons per car. Also used in mine cars, trucks, barges, stripping shovels.

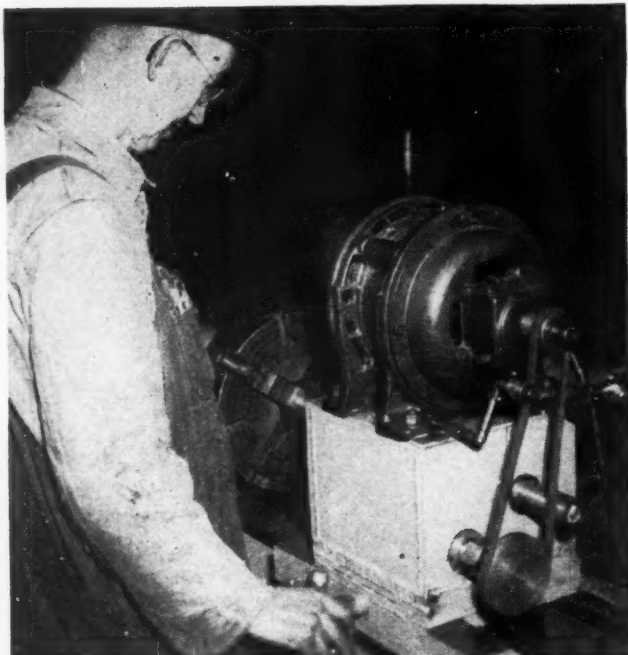
★ Otiscoloy used in coal chutes and backstops reduces wear by abrasion and atmospheric corrosion, and eliminates many costly repairs.

Write for Otiscoloy booklet.

**JONES & LAUGHLIN STEEL CORPORATION**

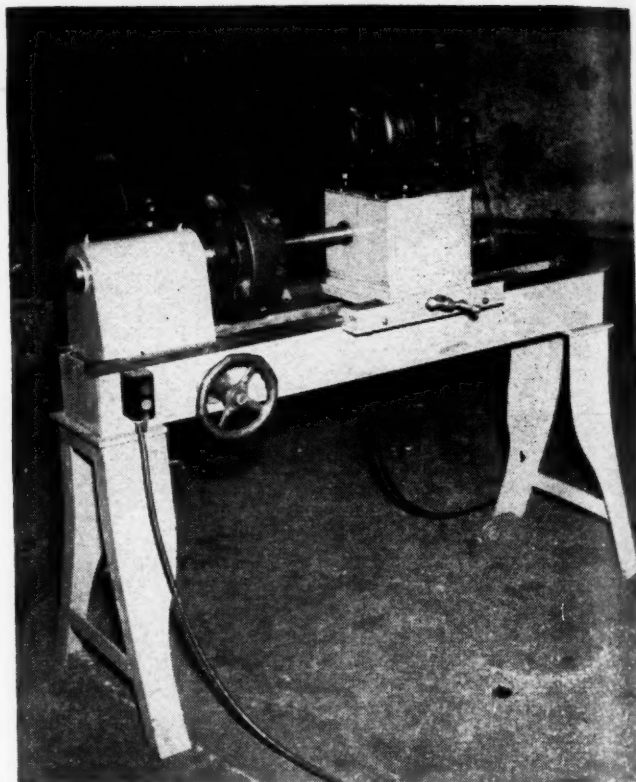
PITTSBURGH 30, PENNSYLVANIA

## Splining Machine Meets Shop's Need



Will Tolleferro, master mechanic, designed and assembled the complete machine.

The shop-made splining machine resembles a lathe.



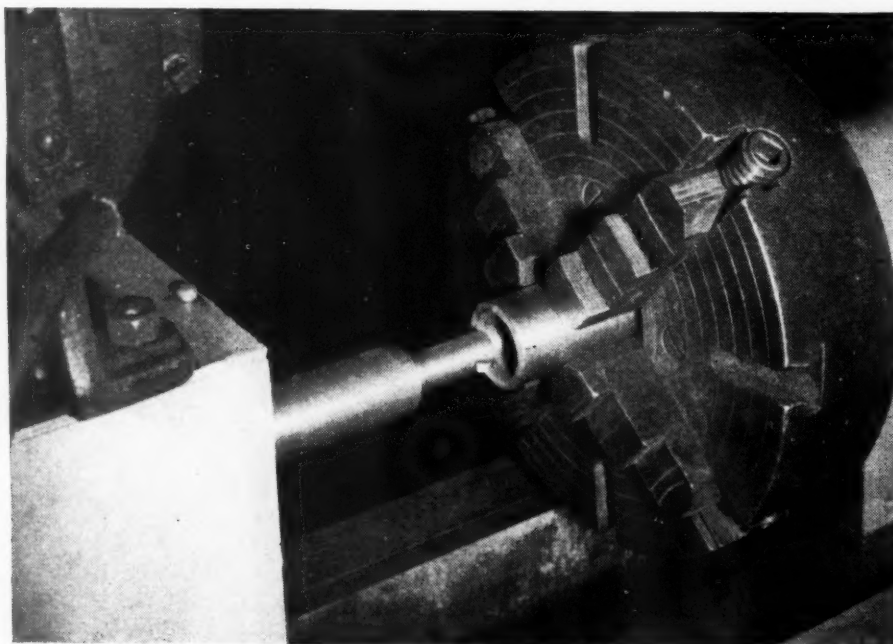
A SPLINE cutting machine, built on the ground, meets specific needs at the general shop of the Hart-Ross Coal Co., Mortons Gap, Ky., states Will Tolleferro, master mechanic.

All the lighter-colored sections of the machine shown in the accompanying illustrations were fabricated at the shop with

the aid of arc welding. The drive and cutting tool operate from what would be the compound rest of a lathe. The cutting tool, driven through a pin and slotted bar from a rotating disk, travels back and forth in accordance with the law of simple harmonic motion. The length of the stroke is adjustable, the ultimate being 34 in. The

work is mounted in the four-jaw universal chuck which is turned and clamped in the position desired.

"The first job for this machine," commented Mr. Tolleferro, "was that of making a coupling to connect the two-section drive shaft, with unmatched grooving, used on each of the machine carriers underground."



The splining tool is steadied by its mounting tube.

### *Improvements?*

Many mines are considered comparatively efficient. But no matter how efficient you think your operation is, you know that there is always room for much improvement. Because ideas are responsible for improvements, we invite you to send in any that you have worked up. It can be a mechanical, electrical, operating or safety idea. If accepted, *Coal Age*, upon publication, will pay you \$5 or more for each.

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300 H.P. WALTER TRACTOR TRUCK hauling 60 ton payload in tandem trailers. 200 H.P. Diesel units haul 30 ton payloads in single bottom dump trailers.

- **HAUL HUGE LOADS.** Walter Tractor Trucks are hauling up to 60 tons of coal and 20 Cu. Yds. of Overburden in toughest running conditions. (See photos).
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- **TAKE HEAVY LOAD AND ROAD SHOCKS.** Ruggedly constructed throughout. Axle is a solid forging with final drive mounted above—not in it.
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- **WIDE GEAR RATIO.** Tractor Type Transmission provides wide gear selection—ample for any emergency. Suspended Double Reduction Drive increases gear capacity.
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300 H.P. WALTER TRACTOR TRUCK with 20 Cu. Yd. Side Dump Trailer. Hauls full loads of overburden through deep mud over broken ground and up steep grades.

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No, we're not magicians but we have worked closely with hundreds of mine operators over a period of twenty-five years. Such close relationship has brought us in touch with many difficult problems. Our knowledge and help is yours for the asking.

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Cincinnati Standard Chain accommodates Stanex Holder and Bit or regular  $\frac{1}{2}$ " x 1" bit. Similar in design to the famous Duplex Chain.



**STANEX HOLDER AND BIT**  
The Stanex Holder and factory made double ended Stanex Bit fits all chains that accommodate the regular  $\frac{1}{2}$ " x 1" bit.

**Y**EARs ago we started out with one thought in mind . . . to build a better Cutter Chain. For twenty-five years we have devoted all our energies and engineering abilities to that one task. Today, Cincinnati Chains and reversible, double-ended Duplex Bits are acknowledged all over the world for their outstanding performance under any and all cutting conditions. Heat-treated and drop-forged, the Cincinnati Chain is engineered to give greater production at a lower cost . . . to hold shutdowns to a minimum . . . to produce larger cuttings . . . to use less power. Let one of our representatives prove to you the advantages of Cincinnati Time Tested Coal Cutting Equipment. There's no obligation.

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# News Round-Up



## Government Operation Continues As Foremen Become a Major Issue

As a full month of government operation of the nation's bituminous mines was completed July 1, with production reaching normal, bituminous coal-mine operators were still at sea as to the future of their industry, and the lack of indication from government quarters that an early return of the mines to private control might be expected was adding no comfort on price, wage and profit difficulties. The Coal Mines Administration, under Admiral Ben Moreell, administrator, lost no time at the beginning of the month in implementing the government-signed contract, issuing several directives and interpretations of the contract regarding safety practices, wage and vacation payments. Plans for a national health and welfare survey were immediately formulated.

On June 25 Secretary of Interior Krug stated that the government would continue operating the seized bituminous mines as long as there was a threat of a strike. He said he could not predict how long the government would be forced to operate them, but added that he did not advocate nationalization of the mines. In some quarters it was thought that delayed settlement of the foremen-unionization issue was holding back any possible trend toward return of the mines.

In fact, unionization of foremen continued to be a major industry problem and threat. According to industry authorities, John L. Lewis had renewed the drive for organization of mine foremen and was reported far ahead of the CIO and other unions in competing drives in other industries.

### Jones & Laughlin Suit Denied

Operators received a strong setback in their efforts to slow the drive, when on June 25 the suit brought by the Jones & Laughlin Steel Corp., seeking an injunction to restrain Secretary of Interior Krug and John L. Lewis from entering into an agreement covering supervisory personnel in the Jones & Laughlin mines, was decided against the steel company by Justice Jennings Bailey in the U. S. District Court for the District of Columbia. The case is to be appealed to the higher court.

Admiral Moreell is on record as having told Lewis that he would negotiate supervisory contracts only at the mines where the union gains NLRB certification. By the end of June more than 200 requests for NLRB bargaining elections among mine foremen had

been made or were being prepared. The government decision to deal only where certification has been made was considered the direct cause of the flood of election petitions.

NLRB priority in the handling of mine-foremen cases was promised in a letter written by Paul M. Herzog, NLRB chairman, to Admiral Moreell on June 25. He stated that the board's regional directors had been instructed "to give priority to cases which have been and will be filed by the Union pursuant to Article 11 of the Krug-Lewis agreement. The Board, likewise, will try to resolve disputed issues expeditiously."

### OPA Prices Set

The long-awaited price relief for the bituminous industry came on June 21 when OPA raised prices an average of 40¢. per ton, for an estimated total increase of \$222,750,000 in the yearly bill to the consumer. The balance of the \$280,550,000 cost estimated under the Krug-Lewis agreement—\$57,750,000 in fact—was to be born by the operators.

In calculating the increases, OPA said it found that operators' higher costs resulting from the wage agreement averaged 39¢. a ton. Salary and supplies cost increases

raised this to 45¢. Of this, OPA figured operators could absorb 11¢. a ton under a cost standard set up by the Office of Economic Stabilization in November, 1943. This cut the cost to 34¢. Strike loss was computed at 11¢. a ton and operators' absorption capacity on this at 4½¢., leaving 6½¢. This 6½¢., plus 34 for higher costs, gave the average price increase of 40½¢. a ton.

For the anthracite industry price increases ranging from 40¢. to \$1.15 a ton, or an average of 91¢. a ton, to cover in part higher costs arising from the new wage agreement, were announced June 25 by the OPA. Total estimated costs arising from the new agreement, increases for salaried workers, higher costs for supplies and strike losses amounted to \$1.04½ a ton, 13½¢. of which the operators were to absorb.

Based on an anticipated production of 49,000,000 tons during the year ending May 31, 1947, the total cost to the anthracite consumer of the increases allowed amounts to \$44,500,000.

### Coal Prices Remain Firm

While the death of the OPA June 30 removed all controls on coal prices, substantial additional increases were not immediately expected by either government or industry leaders. The uncertainty of the situation with regard to OPA, plus the competition of other fuels, were thought to be limiting factors in any runaway price race. The Solid Fuels Administrator pointed out that the end of the OPA had killed ceilings on coal produced by government-operated mines as well.

Prompt action to put into effect the health and safety provisions of the Krug-Lewis contract marked the beginning of the month. Rear Admiral Joel T. Boone was named medical adviser to the Coal Mine Administrator and immediately began a nation-wide survey of health conditions and community facilities. The survey, which was being carried by navy medical officers to typical mining communities in every State, was expected to take three months in all and serve as a basis for government reform.

On June 7 the CMA issued Administrator's Interpretative Bulletins Nos. 1 and 2. The first clarified the daily wage increase, especially for outside men whose increase was put at \$1.85 daily, or 21¢. per hour, as the hours worked total only 8½ daily. The second stated that no fines or penalties will be imposed without authorization from the Coal Mines Administrator, and if any are imposed the funds withheld will go into the fund provided under Section 4 (b), the fund

## Gas-Turbine Locomotives Slated for Rail Test

Purchase of two coal-fired locomotive-type gas turbines rated at 3,000 rail horsepower and the construction of two locomotives incorporating the turbines was authorized at a meeting of the Locomotive Development Committee in New York July 10. One turbine will be purchased from the Elliott Co. and the other from Allis-Chalmers. A decision as to who will get the job of building the two locomotives had yet to be reached, but indications were that it might be a joint effort. The turbines are expected to be delivered in 18 months or less, meaning that the two full-sized locomotives, using gas turbines fired with coal, should be on the road in less than two years.

to be administered solely by the union.

An order issued June 7 by CMA established interim safety requirements where applicable for the bituminous mines in government possession. These will be in force until the Federal Mine Safety Code, called for by the Krug-Lewis agreement, is formulated. A committee to assist in formulating this code was selected by Dr. R. R. Sayers, director, U. S. Bureau of Mines, and included D. A. Lewis and Harrison Combs, representing the U.M.W.A.; G. H. Sambrook, director of personnel and safety, H. C. Frick Coke Co., and A. J. Bartlett, director of safety, Island Creek Coal Co., industry representatives; and John E. Jones, chief safety engineer, Old Ben Coal Corp., and safety consultant to Admiral Morecell as representative of the CMA.

Appointment of Rear Admiral W. J. Carter, Navy Paymaster General, as temporary custodian of the welfare and retirement fund was announced June 28. Admiral Carter will serve as custodian of the funds until permanent trustees as established by the contract are named.

More than 200 anthracite operators met in Wilkes-Barre June 28 to learn the details of the new contract which was formally ratified by the U.M.W.A. on June 26. Major W. W. Inglis, president, Glen Alden Coal Co., and chairman of the operators' wage negotiating committee, outlined the contract and the latest price and government regulations affecting operation.

While the new anthracite contract, signed June 7, was patterned after the government-effected bituminous agreement, it was notable in several major differences. First, only one health and welfare fund (5c. per ton) was established and it is to be managed by three trustees, two appointed by the president of the U.M.W.A. and one by the operators. On the other hand, the power of the anthracite mine committee to close a mine was not included; mine committees may request action by State and federal inspectors.

Major provisions of the anthracite agreement were: (1) wage increase of \$1.29 $\frac{1}{2}$  daily, 18 $\frac{1}{2}$ c. per hour for seven hours; (2) work week of five days, seven hours, sixth day optional but if worked to be paid at time and a half; (3) vacation payment raised from \$75 to \$100; (4) a health and welfare fund of 5c. per ton paid by operators and managed by three trustees, two appointed by the president of the U.M.W.A., and the third by the operators; (5) acceptance of Pennsylvania workmen's compensation and occupational disease laws; (6) acceptance of federal safety regulations where not in conflict with State laws; (7) agreement to be guided by decision of the National Labor Relations Board on unionization of foremen, technical and clerical workers.

A new contract providing for an over-all \$1.57 a day wage increase was signed June 13 between the Progressive Mine Workers of America and the Illinois Coal Producers' Association. Provisions of the new contract were made retroactive to April 1, PMW President John B. Marchiando said, and the contract will run to March 31, 1947. Under the new contract the basic wage scale of the miners will be \$10.07 per day, an increase of 18 $\frac{1}{2}$ c. per hour over the \$8.50 daily rate under the old contract, Marchiando said. In

## Coal Activity

### Bituminous Coal Stocks

	Thousands Net Tons	P.c. Change— From May 1, 1946	P.c. Change— From April 1, 1946	P.c. Change— From May 1, 1945
Electric power utilities...	12,044	-23.3	-2.6	-2.6
Byproduct coke ovens...	4,128	-50.1	-7.3	-7.3
Steel and rolling mills...	527	-47.6	-24.1	-24.1
Railroads (Class I)...	7,585	-42.7	-20.2	-20.2
Other industrials*	12,073	-29.1	-5.9	-5.9
Total.....	36,357	-34.4	-8.8	-8.8

### Bituminous Coal Consumption

	Thousands Net Tons	P.c. Change— From April 1946	P.c. Change— From Mar. 1946	P.c. Change— From Apr. 1945
Electric power utilities...	5,192	+1.6	-12.1	-12.1
Byproduct coke ovens...	5,505	-22.5	-26.1	-26.1
Steel and rolling mills...	730	-10.4	-14.1	-14.1
Railroads (Class I)...	8,256	-20.5	-22.0	-22.0
Other industrials*	8,419	-29.6	-26.8	-26.8
Total.....	28,102	-20.6	-22.3	-22.3

\* Includes beehive coke ovens, manufactured gas plants and cement mills.

### Bituminous Production

May, 1946, net tons.....	20,420,000
P.c. change from April, 1946.....	+536.1
January-May, 1946, net tons.....	184,490,000
P.c. change from Jan.-May, 1945.....	-25.0

### Anthracite Production

May, 1946, net tons.....	5,468,000
P.c. change from April, 1946.....	+7.3
January-May, 1946, net tons.....	25,814,000
P.c. change from Jan.-May, 1945.....	+22.6

### Sales, Domestic Stokers vs. Oil Burners

	Stokers	Burners
April, 1946.....	14,110	28,034
P.c. change from April, 1945.....	+170.2	+400.3
January-April, 1946.....	57,301	102,870
P.c. change from Jan.-Apr., 1945.....	+184.6	+352.8

### Index of Business Activity\*

Week ended June 22.....	172.6
Month earlier.....	157.3
Year earlier.....	218.7

\* Business Week, June 29

### Electric Power Output†

Week ended June 22, kw-hr.....	4,129,163,000
P.c. change from month earlier.....	+4.1
P.c. change from year earlier.....	-5.3

† Edison Electric Institute.

addition the miners were guaranteed a one-week vacation with a \$100 bonus payment for the period.

The Progressives' contract establishes a welfare fund to be supported by mine operators at the rate of 5c. for every ton of coal hauled from their mines. The fund will be administered by two trustees, Marchiando representing the miners, and Walter C. Gill, of Peoria, president of the operators' association, representing the mine owners. All actions of the trustees will be subject to approval by the joint board representing the operators and union.

## New Coal Film Features W. Va. Mining

"Magic Mineral," a short motion picture dramatizing coal mining and coal's part in the nation's industry, will be available in July for distribution to theaters, schools and clubs throughout the country. Actors in the film are all residents of the Bluefield, W. Va., area, where the film was made.

Underground pictures of mining operations, new mining machinery, safety procedures and training of beginners highlight the film, and special emphasis is placed on a Mercer County school, where 'teen-age youngsters learn the ABC's of bituminous mining. Expert photography and narration distinguish the 12-minute picture.

"Magic Mineral" is distributed by its producers, Universal Pictures.

## New SFAW Order Controls Shipments

SFAW on June 28 issued Regulation No. 32, a new order providing for distribution control over coal produced in Districts 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, and 13. According to Secretary of the Interior Krug, who, as Solids Fuels Administrator, announced the order, it "is designed to force shipments to the Lakes during the limited navigation season and to encourage a more extensive use of the lower grade coals to relieve the heavy demand for the scarcer high grade coals.

"Provision is made for shipments," Mr. Krug said, "Firstly, to the Lakes during the navigation season to meet minimum requirements of consumers who depend largely or entirely on lake movement, secondly, to retail dealers to provide adequate supplies for domestic space heating, and thirdly, to industries to maintain operations and restrict unnecessary stockpiling until more coal is available for rail movement after the close of the lake navigation season."

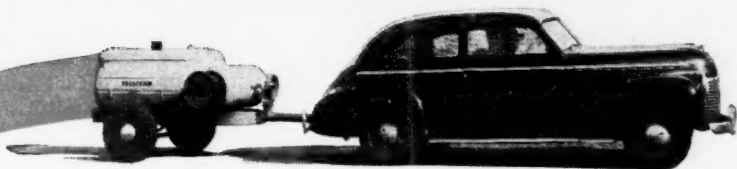
## House Subcommittee To Study Coal Uses

A standing subcommittee of the House mines and mining committee has been created to study the production and uses of coal, according to an announcement made June 10. The new subcommittee is headed by Rep. Jennings Randolph (D., W. Va.), who said that he would schedule hearings as soon as possible on the new uses of coal. "We are going into all phases of the industry," he said. Other members include Augustine B. Kelley (D., Pa.), E. H. Hendrick (D., W. Va.), Gerald W. Landis (R., Ind.) and Robert F. Rockwell (R., Colo.).

## Rail Rates Upped Temporarily

The Interstate Commerce Commission on June 21 announced approval of increased freight rates up to six percent for railroads throughout the nation. The decision generally restores increases previously under suspension and makes important additions and changes. The increases approved are temporary, pending further study by the commission, and take effect July 1 on short notice.

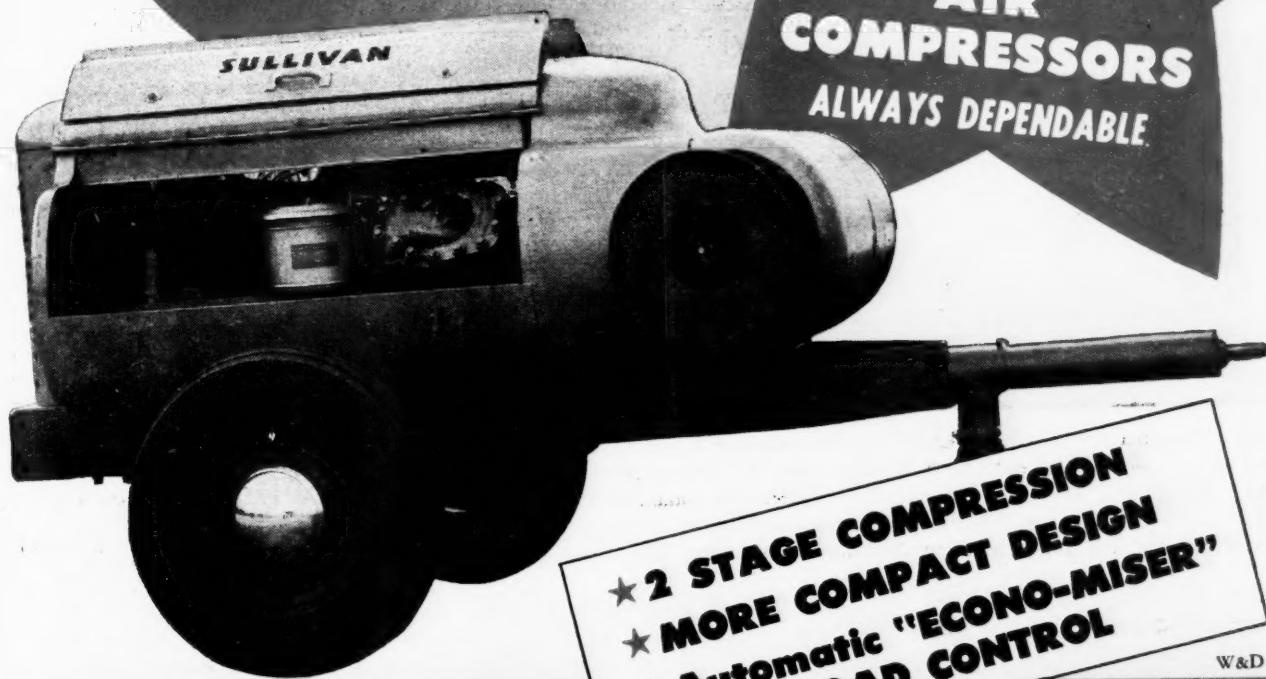
For coal and coke, the total of the increase effective July 1 is 6c. per ton on present rates under \$1.00 and 8c. a ton on rates over \$1.00.



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# Mine Inspectors' Institute Holds 36th Annual Convention

Lessons learned from recent coal-mine disasters, progress made toward the manufacture of flame-resistant trailing cables, how to encourage more young men entering coal mining and many other aspects of safety development were discussed at the 36th Annual Convention of the Mine Inspectors' Institute of America held June 3-5 at the Sterling Hotel, Wilkes-Barre, Pa. Membership of the Institute crossed the 500-mark with representation in 26 states. The 1947 convention is to be held in Denver, Colo.

One of the highlights of the several social sessions was an address by Pennsylvania's former Governor Arthur H. James. Gov. James, one-time bratticeman's assistant to Henry R. Owens, the Institute's retiring president, said, "If we are to resume orderly and free government, it appears to me that the time must not be far distant when disputes concerning wages and working hours can be submitted to the judicial review of some properly designated court—either one now in existence or one specially created for the purpose."

Leading off the session entitled "Lessons to Be Learned From Recent Mine Fires and Explosions" was a paper by Robert H.

Brown and John Moore on the explosion at the Bond Valley Coal Co., Haileyville, Okla., on Jan. 17, 1945. This mine was being operated by a small group of miners on a cooperative basis. Ten men were employed underground and three on the surface. On the day of the explosion only 9 men were working underground; all were killed.

The seam pitches from 15 deg. near the surface to a maximum of 48 deg. Coal in the haulage entry on the strike is undercut but in the 8-ft. wide air course paralleling it, and above it on the pitch, and in the narrow crosscuts through the 20-ft. pillar between these entries the coal is shot on the solid. Between the air course and the next entry along the pitch, a distance of 150 ft., is the longwall operation.

An investigation following the explosion disclosed that the face entry had been undercut, drilled, and the lower shot hole fired. The upper shot hole had not been loaded. The longwall machine had undercut the face up the wall about 30 ft. and the machine stopped at the jack post. About 8 ft. of the lower part of the longwall face had been dislodged and loaded out. The

upper rib shot hole in the counter had been fired but failed to dislodge the coal and blew out. Burned fuse was found in the counter which indicated that the shot was detonated by a blasting cap. The crushed condition of the coal in the immediate vicinity of the shot hole indicated the hole had a heavy charge. The disaster was attributed to a coal dust explosion initiated by the blown out shot in the counter.

The two mine explosions in 1945 which halted Utah's record of 15 years without a serious explosion were discussed in a paper by R. H. Dalrymple, commissioner for the Industrial Commission of Utah. The first was in the Kenilworth mine of the Independent Coal & Coke Co., Kenilworth, Utah, on March 14. The second, with a much greater loss of life, was in the Sunnyside No. 1 mine of the Utah Fuel Co., Sunnyside, Utah, on May 9.

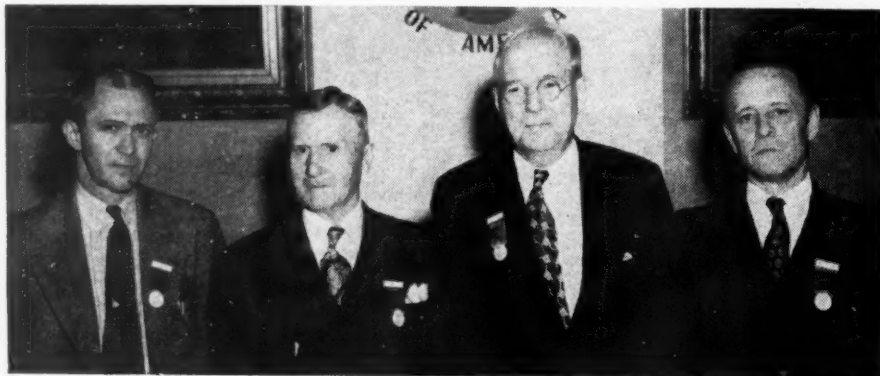
## Utah Explosions Explained

At Kenilworth, the explosion, which eventually claimed seven lives, occurred in a pillar section following a severe bounce which had thrown into suspension fine coal dust and an unknown quantity of methane. This explosive mixture of coal dust, or coal dust and methane, was ignited by the short circuiting of a 250-volt d.c. rubber-insulated two-conductor machine cable, which was ruptured at the point of entrance into the loading machine. The bounce, attributed to the heavy overburden and which ranges up to 1,800 ft. in Utah, dislodged coal from the rib that placed too severe a mechanical strain on the cable.

The flash limit of the explosion extended to a point 260 ft. outby and approximately 170 ft. inby the point of ignition and was confined to 100 ft. in crosscuts running at right angles to what was considered the main line of force. No indication of coke was found in the area and only a moderate coating of soot was noticed on the ribs, roof and timbers. None of the 12 men affected were overcome by gas and all but one man walked out unassisted. The duration of the flash was long enough to burn through some clothing of part of the men with the result that some men suffered a surface-burn area in excess of the critical limit for recovery, not to mention any internal effects resulting from the gases inhaled.

The systematic and generous use of rock dust (3.1 lb. per ton of coal mined) is credited with having localized the explosion, sparing the lives of the remaining 156 men at work in the mine. The mine is ventilated by the exhaust, split system.

The Sunnyside explosion occurred 20 minutes before quitting time for the day shift on May 9, the day following the V-E day holiday. A gas explosion with very little coal dust in suspension, ignited somehow, killed 23 of a force of 85 men outright by violence, burns and afterdamp. Gas from feeders opened up when two dip entries encountered a fault that was observed by the fireboss on numerous occasions in the area of the explosion. A few hours prior to the explosion a curtain in the last open slant, which was a haulageway, had been discovered raised, allowing the air to short circuit rather than course the face. A non-permissible pump motor and control, installed in the back dip entry inby the last open slant three days prior to the explosion, may have



Those who participated in discussing encouraging the entrance of young men into the coal-mining industry were, left to right: G. R. Spindler, chief, Department of Mines, Charleston, W. Va.; Griff Morris, director, Bureau of Mines & Mining, Indianapolis, Ind.; Cadwallader Evans, Jr., vice president, The Hudson Coal Co., Scranton, Pa.; and H. B. Northrup, director, Mineral Industries Extension Services, Pennsylvania State College.



Among the speakers at the opening session were, left to right: H. E. Risser, coal mine section, National Safety Council, Inc.; John H. Hansford, Department of Mines, Charleston, W. Va.; and Robert D. Bradford, engineer in charge, McAlester, Okla. Station, U. S. Bureau of Mines.

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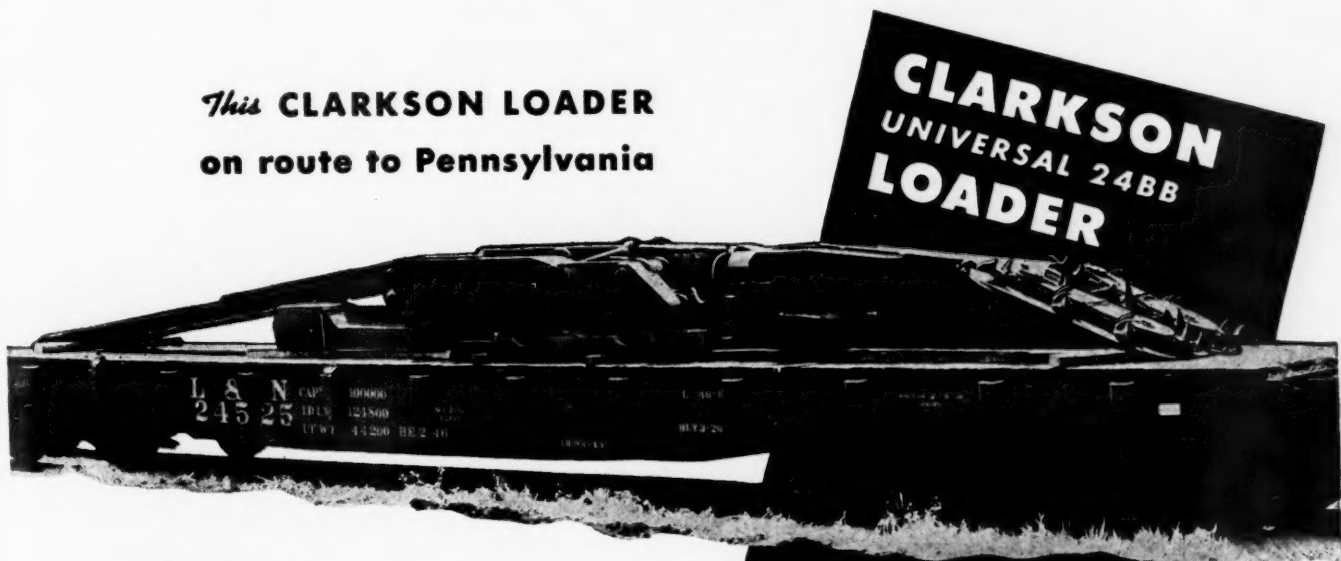
Peale, Peacock & Kerr in their Springfield Coal Corp. mine at Spangler, Penna., have found the answer on haulage by adopting a large 5 ton car and loading direct into 18' 9½" mine cars with 56½" track gauge. Coal height being 36" to 42"—car height 24".

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Henry R. Owens, retiring president of the Mine Inspectors' Institute.



Dr. J. J. Rutledge was re-elected treasurer of the Institute.



Speakers Monday and Wednesday included, left to right: George W. Grove, supervising engineer, District A, U. S. Bureau of Mines, Pittsburgh; F. E. Griffith, electrical inspector, Bituminous Division, Department of Mines, Canonsburg, Pa.; and Thomas R. Weichel, mining-electrical engineer, Coal Mine Inspection Division, U. S. Bureau of Mines, Mt. Hope, W. Va.

figured in the explosion. Matches and cigarettes were found on the body of one of the victims. A part of a badly damaged permissible flame safety lamp also was found. The motor controls of all the face equipment, which were of the permissible type, had been shut off prior to the explosion and the crews appeared to be on their way out.

Sunnyside is ventilated by the exhaust split system. The 55 men who escaped the blast unassisted and the seven men who were hospitalized for a time were spared probably because the section wrecked was thoroughly rock dusted (3.5 lb. per ton of coal mined) on Sunday before Wednesday's explosion.

In describing the explosion at the Belva mine, Kentucky Straight Creek Coal Co., Fourmile, Ky., which occurred Dec. 26, 1945, Harry D. Thomas, chief of the Department of Mines & Minerals, Lexington, Ky., said it is likely that the explosion resulted from an ignition of gas followed by coal dust propagation. At the time of the explosion, which was in the morning, 31 men were in the mine. Twenty-two men were killed by violence and burns, and nine men were rescued alive; however, four of these died later, making a total of 26 fatalities. Twenty bodies are sealed inside.

The point of ignition was about 2½ miles inside the mine and flame traveled from the

point of ignition to the portals, starting 22 separate and fairly well spaced fires. These fires occurred because of the presence of old wood, from either old stoppings, timbers or ties. In that portion of the mine explored during the recovery work (1,700 ft. still sealed off), although all stoppings were blown out there was little evidence of violence anywhere. This absence of violence, continued Mr. Thomas, would indicate that, though the flame traveled this distance, it must have almost completely died down several times. This suggests that even a short section of rock-dusted entry and air course probably would have stopped the propagation of the explosion.

Although 22 fires had to be fought, the direction of air-travel reversed, 150 or more temporary stoppings built, five major and innumerable small falls cleaned up, eight live men were rescued 59 hours after the explosion. These men had not barricaded themselves effectively. In this instance, rescue teams demonstrated that rescue could be performed open-faced (without respiratory protection). As the eight men were carried out they were given inhalator treatment at three separate stations along the way. It is thought that if these men had had self-rescuers they could have made their way to the outside in safety.

The lack of fire-fighting equipment, rock dust, a rock-dust distributor and a suitable mine map were cited as some of the things that hampered the rescue work.

The main ventilating fan had been down for at least three full days over the Christmas holiday. It also was customary to ventilate with the help of a booster fan. While the force of the explosion moved the fan casement several inches, nevertheless, the explosion doors operated enough to prevent serious damage to the fan. However, reversing the fan required considerable time.

The results of this explosion emphasize the need for advance planning on methods of working and coal extraction which include the possibility of sealing sections of a mine at some future date.

The explosion on Jan. 15, 1946 at the Havaco No. 9 mine of the New River & Pocahontas Consolidated Coal Co., Havaco, W. Va., was described by John H. Hansford as a dust explosion in reverse. The disaster claimed the lives of 15 men, injured 36 others and caused extensive property damage. The area of the explosion was confined to the workings within a radius of 1,200 ft. of the shaft bottom, the hoisting shaft, tipple and buildings closely surrounding it. The dust was ignited by the firing of an unconfined charge of 40-percent gelatin dynamite in a crevice to bring down a loose brow of slate along the haulageway.

#### Low-Volatile Dust Explosive

The coal dust, once deposited by the intake air and afterwards not rendered inert through the addition of rock dust, propagated the explosion after being touched off by the unconfined shot of dynamite. However, except for a few areas the mine was well rock dusted (4.209 lb. of rock dust per ton of coal mined). This explosion refutes the popular fallacy that low-volatile dust is not very explosive. The volatile matter of No. 3 and No. 4 Pocahontas dust at this operation was 15 and 16 percent respectively and this is low among the low-volatile group. Yet it was ignited by the flame of an explosive and was self-propagated as long as the incombustible content of the dust cloud remained below 65 percent.

The lesson of this explosion, as Mr. Hansford points out, is to beware of float dust from all sources.

In summing up the lessons to be learned from these explosions, George W. Grove, supervising engineer, U. S. Bureau of Mines, Pittsburgh, Pa. listed the lessons as follows:

#### Bond Valley Mine—

1. Coal should be undercut, top-cut, or sheared before blasting.
2. Dynamite should not be used for blasting purposes in a coal mine.
3. Excessive charges of explosives should not be used.
4. Only permissible explosives charged and fired in a permissible manner should be used.
5. Water or a wetting solution should be used to allay coal dust.
6. Thorough rock dusting should be practiced.

#### Kenilworth Mine—

1. Since it is known that bounces can be minimized or eliminated by proper mine development, by maintaining a straight pillar line, and by extracting all the coal from pil-



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A coal producer needs two sets of machinery . . . one for the production of *coal* and another for the production of *orders* and *dollars*.

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lars so that no roof support is left by the coal, every effort should be made to carry out such procedure.

2. Trailing cables of portable and semi-portable equipment should be provided with overload protection by proper connections to permissible junctions or distribution boxes.

3. Adequate rock dusting will limit or localize explosions, thereby protecting the lives of workmen who may be in other sections of the mine and minimizing property damage.

#### Sunnyside No. 1 Mine—

1. Positive means of ventilation should be maintained at all faces, and a sufficient quantity of air should be circulated to dilute and carry away all harmful gases.

2. Temporary stoppings between intake and return air courses should be replaced as soon as possible with substantial permanent stoppings.

3. When it is necessary to use doors for deflecting air currents, they should be erected in pairs.

4. Doors and check curtains should be closed immediately after equipment or men pass through the doorway or opening.

5. Management is responsible for providing, inspecting, and maintaining adequate ventilation, and employees have equal responsibility not to disturb or destroy established ventilation by changing the normal position of doors, curtains, or other installations without orders to do so.

6. Non-permissible electrical equipment should not be used at or near working faces where methane is being liberated.

7. Flame safety lamps should be maintained in permissible condition by a competent person and should be carefully checked by each person using them before they are taken into the mine.

8. Matches and smokers' articles should not be taken into a mine and a search at frequent intervals should be made of all persons entering the mine.

9. Undoubtedly, this explosion was localized and the lives of men working in other parts of the mine were saved because of the rock-dusting.

#### Belva Mine—

1. Mines in which methane can be detected should be considered as gassy and operated as such.

2. Preshift examinations should be made of mines known to be liberating methane.

3. Adequate ventilation, properly distributed and controlled, should be provided at all working faces to dilute and render harmless and carry away any flammable or harmful gases.

4. Only permissible electrical equipment, properly maintained, should be used in face regions where methane is being liberated.

5. Water should be used to allay coal dust at its source.

6. Adequate rock dusting should be provided.

7. If mines are operated or are permitted to operate under the highly dangerous conditions prevailing in this mine, explosions are almost certain to occur.

#### Havaco No. 9 Mine—

1. Dynamite or other explosives, except permissible explosives or permissible blasting devices, should not be used for blasting in coal mines.



C. A. McDowell, who was re-elected secretary, pauses for a moment in the midst of his duties.

2. Each charge of explosives fired in any coal mine should be confined in a properly drilled borehole by means of incombustible stemming; and open, unconfined shots, such as crevice, adobe, mudcap, or any form of bulldozer shots, should be not fired.

3. While permissible explosives are capable of igniting coal dust under certain conditions, dynamite in any form, because of the higher temperature, longer duration, and greater volume of flame, is much more likely to cause such an ignition.

4. When dangerous conditions are reported, every effort should be made to correct them immediately. If the dangerous roof reported by the fireboss had been taken down promptly, a sufficient amount of coal dust to initiate the explosion may not have collected in the crevice, even if a shot had been fired under the otherwise dangerous prevailing conditions.

5. Means should be provided to allay coal dust in the face regions, such as during cutting, loading, blasting, and transportation, and thereby reduce the dust hazards in the mine, as well as reduce the amount of dust formed during hoisting, dumping, and coal-handling operations in the tippie.

6. Provisions should be made to prevent dust formed during dumping and screening processes in the tippie from entering the mine by the installation of an effective dust-collecting system or water sprays placed at strategic locations, or both.

7. Ledges and flat surfaces of horizontal structural members in tipples should be kept free of coal dust or such surfaces should be kept covered with rock dust to the normal angle of repose.

8. Provisions should be made to wash down coal dust as necessary in the vicinity of the hoisting shafts.

9. All areas in the mine, including the vicinity of the hoisting shaft, when not actually wet, should be adequately rock dusted.

10. Rock dust which has been applied in the haulageways and adjacent areas prevented this explosion from traveling into the

mine and thereby prevented additional injuries and fatalities and property damage.

The aim and ambition of the Coal Mining Section of the National Safety Council, said H. E. Risser, staff representative, is to do everything within its power to decrease accidents and increase safety and to reduce the number of accidents to an absolute minimum. Among the services of the Council made available to its membership are the news letter, safe-practice pamphlets and industrial data sheets, posters, safety-instruction cards and consulting service. The Council feels that when all parties interested in the welfare of the mining industry join forces, then much can be done to reduce coal-mining accidents.

#### Trailing-Cable Development

In recounting the history of trailing cables, F. E. Griffith, electrical inspector for the Pennsylvania Department of Mines, spoke of the old crushing test which was used for determining toughness. The test consisted of running a car of pig iron, whose total weight was seven tons, over the cable specimen. If a failure of the electric-current loaded conductors did not occur with a frequency greater than one in ten tests, the cable was recommended. Greater over-all safety and added life resulted when cables conformed to this test.

Following the outbreak of war in 1941 cable manufacturers were forced to find a substitute for natural rubber. This led to the discovery that the proper compounding of Neoprene (a type of synthetic rubber) gives a highly desirable flame-resistant property to cables. On May 15, 1945, Pennsylvania passed a law, based upon a bill suggested by Richard Maize, secretary of the Department of Mines, which makes it unlawful to use trailing cables on portable electrical machinery in coal mines unless such cable is safely and efficiently insulated by flame-resisting material and approved by the Secretary of Mines. Rigid specifications, based on exhaustive tests, are now being used by 13 cable manufacturers who have been issued approval numbers by the State of Pennsylvania.

The mining law governing the application of flame-resistant trailing cables in underground mines, as passed by the State of Pennsylvania, applies to all trailing cables No. 14 AWG and larger or any other power or control cables in these sizes when said cable is reeled or coiled on equipment or dragged on the mine floor. The test consists of doubling a 6-ft. sample back on itself to form a loop, clamping the two sides of the loop together with metal clips, and passing a current equal to five times the rated current-carrying capacity through all conductors. The current loading is continued until the sheath temperature reaches 350° F. Then a flame is applied for one minute to ignite the cable. The flame is removed, the current shut off, and the cable is allowed to burn. If the total length of the destroyed sheath does not exceed 14 inches the cable is judged satisfactory.

Because flame-resisting trailing cables appear to promise much as a safety measure the Institute expects to make Mr. Griffith's paper a part of its Standards.

The development of flame-resistant trailing cables for the mining industry is truly an outstanding achievement, said Thomas R.

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1. Make, model or class of locomotive.
2. Weight.
3. Type of service.
4. Sketch showing overall dimensions.
5. Track gage.
6. Sketch showing arrangement of brake rigging and dimensions of levers.
7. Current supply to oil pump motor: (a) trolley or battery? (b) Nominal, minimum or maximum voltage.
8. Hydraulic sanding required?
9. Single or tandem operation?
10. If tandem (a) permanent or intermittent? (b) one or two control stations? (c) all equipment on one locomotive? (d) 4 point or 2 point sanding?



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WILMERDING, PA.

Weichel, mining-electrical engineer from Mt. Hope, W. Va. Stat, in discussing the paper. The new-type cables, he continues, utilizing thermosetting materials are close facsimiles of earlier cables, but in general are insulated with Buna-S synthetic-type rubber compounds and Chloroprene (Neoprene) jackets. Buna-S has good dielectric, chemical, and physical properties, but it is flammable and offers only fair resistance to oil, ozone, and sunlight. Neoprene has poor dielectric properties, but it has good physical properties, offers excellent resistance to ozone and sunlight, and is excellent as a non-flammable material. The dielectric properties in these materials include dielectric strength, capacity, power-factor, and insulation resistance. The chemical properties include resistance to oxidation, acids, alkali, and moisture; and physical properties include tensile strength, elongation, toughness, and abrasion resistance. It may therefore be understood why Buna-S is used as the immediate insulation for the conductor and Neoprene as the outer protective jacket. The combined application of these synthetic materials in the construction of trailing cables may not be a cure-all, but it is a step in the proper direction.

### Encouraging Young Men

A symposium treating with the subject "How Can Young Men Be Encouraged to Enter the Coal-Mining Industry" began with the viewpoint of the Mine Inspector by G. R. Spindler, chief, Department of Mines, Charleston W. Va.. The nation cannot afford to allow the men to drift away from the mining industry, he said, and one way to reverse this trend is to make the industry sufficiently attractive for the miner's son. The coal mine inspector's first and most logical contribution toward the solution of this problem and to the general health of the industry is to spare no effort to make our mines as safe and as free from accidents as they can be made.

Personnel has not progressed as fast as has machinery for mining, stated Griff Morris, director of mines for Indiana, in his discussion of Mr. Spindler's paper. There is need of vocational training in the public schools to make the personnel more mechanically minded. More vision, the vision of youth, is needed in the industry.

In presenting the viewpoint of the operator, Cadwallader Evans, Jr., vice-president, The Hudson Coal Co., said we need to speak a positive word for the industry. Its dirt, which many frown upon, is clean dirt—not dirty dirt. The dignity of the job must be played up. We want machine mine technicians—not laborers. Vocational schools can be part of the solution if mine-minded men take the trouble to see that they are rightly managed. He explained that the Hudson Coal Co.'s policy of promotion "up through the ranks" has meant much in attracting men to their company rather than to other companies in their field. The audience liked Mr. Evans' frank admission that the paper was not written by him but was the work of some one in his organization—a great boost for the one working up, and a mark of distinction for one already at the top.

Vocational mining high schools in all mining regions were advocated by H. B. Northrup, director, Mineral Industries Extension Services, Pennsylvania State College, is discussing Mr. Evans' paper. In Pennsylv-

## 1946-47 Officers Mine Inspectors' Institute of America

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vania, funds are available and all that is needed is to apply for them. For 53 years Extension Services has been holding evening classes for mining men. The instruction costs the miner nothing except the cost of his textbook. It is a sad commentary in closing this discussion, said Dr. Northrup, to state that with few exceptions, most of the mining companies support this effort on the part of their men with "dignified acquiescence" rather than with "enthusiastic cooperation."

Closer supervision means fewer accidents at the face, declared Daniel H. Connelly, Pennsylvania mine inspector. The judgment of an individual is not a proper substitute for supervision. In the anthracite region, the mine foreman or his assistant does not spend more than six minutes per shift with workmen at the working face. With men returning from the service and war plants to the mines, more supervisors are imperative if good safety figures are to be maintained.

In discussing Mr. Connelly's paper, C. A. Sine, Safety Engineer, Stonega Coke & Coal Co., said their foremen make at least two daily examinations of places assigned them. Each foreman fills out a report form each day on the condition of each place visited and records the time of each visit.

Escapeways must be planned in advance if they are to be ready for service when an emergency arises, cautioned J. V. McKenna,

Pennsylvania bituminous mine inspector. He described a 36-in. diameter 240-ft. drilled shaft recently put down by the Pennsylvania Drilling Co., Pittsburgh, Pa. The shaft serves a clay mine of the McLain Fire Brick Co., Wellsville, Ohio. It is economical to drill these shafts to a depth of 500 ft., and he recommends their use as emergency escapeways for coal mines. The torpedo-shaped cage can accommodate 3 to 4 men and the shaft requires no lining except in the soft material where it is lined with concrete under pressure.

No shaft that is used as an up-cast shaft should be considered safe as an escapement way when there is a mine fire, said Stephen Williams, chief, Ohio Division of Mines, while discussing escapement ways from mines in case of fire. Mr. Williams also described the Powhatan mine fire which occurred on July 5, 1944.

Falls of roof are one of the most important contributory causes of mine fires of electrical origin, stated A. Lee Barrett, maintenance engineer, Pittsburgh Coal Co. Straight headings of even width and main line timbering without the use of legs will help to eliminate falls and serious wrecks. The elimination of short humps and dips through grading as well as good drainage should not be overlooked on the haulage ways. Slag or rock ballast has proven best and should be deep enough to permit tamping under the ties.

The allowable voltage drop should not exceed 20 percent from substation to motor terminal, with the drop equally divided between the overhead feed and the track return. The 2,300 and 4,000-volt circuits should carry a grounded shield and, whenever surface conditions permit, power circuits should enter the working area through boreholes. Increased sectionalization of d.c. circuits also was recommended. And in each case sufficient feeder and return circuit capacity should be provided so that the overcurrent protection will be tripped by a dead short circuit at the most remote point of the circuit. Mr. Barrett pointed out that breakers in the substation protect the substation—not the mine. Extra overcurrent protective devices are needed between substations.

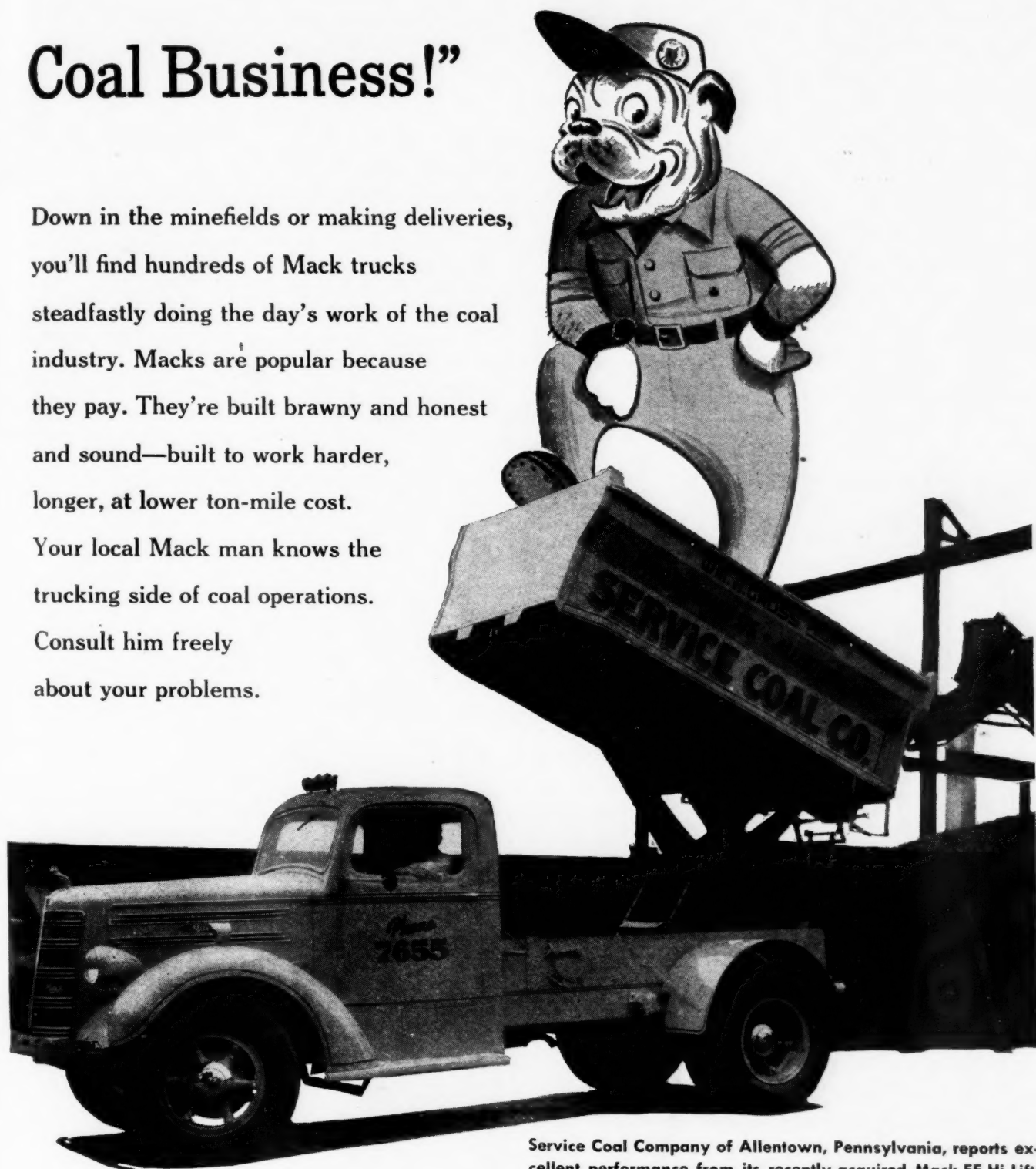
On mercury-arc rectifiers, installed with reverse polarity (trolley negative), electrolysis occurs at the substation ground where current leaves the system to be conducted through the ground. Hence, adequate grounds, such as large cast-iron castings buried in the ground, must be maintained at this point if the system is to operate satisfactorily. The importance of a rigid inspection service also was emphasized.

In Eastern Kentucky, a survey showed that the haulage workers (who account for about 14 percent of the workers) suffer 20 percent of the total number of mine injuries, according to Arthur Bradbury, safety engineers, Inland Steel Co. Of the haulage workers, the brakemen or triprider class suffers the highest percentage, most of these occurring during gathering operations. As many as 33 causes of haulage accidents were listed and remedies were prescribed for most.

In discussing the preceding paper, Robert Flynn, assistant chief safety inspector, Tennessee Coal, Iron & R.R. Co., emphasized the matter of training. His belief was that the primary objective of training is to quicken one's thinking rather than to teach something new.

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# Marketing, Mining and Safety Goals Analyzed at Rocky Mountain Meeting

Merchandising, coal research and kindred topics constituted a major part of the proceedings at the 42nd regular meeting of the Rocky Mountain Coal Mining Institute, held at the Cosmopolitan Hotel, Denver, Colo., June 6-8. The need for more activity in these directions was stressed by D. H. Pape, institute president and head of the Sheridan-Wyoming Coal Co., Inc., who presided over the several sessions, taking in also coal-mining methods, safety, coal preparation and petroleum products in mining.

Resolutions adopted by the institute commended Bituminous Coal Research, Inc. and urged increased support; commended the national coal-heat service program of the National Coal Association; opposed government policy in leasing land for stripping purposes contrary to regulations; deplored actions of city officials in attempting to prevent use of steam locomotives without first acquainting themselves with modern equipment, such as the overfire air jet developed

by the industry; condemned government seizure of property and negotiation of wage agreements; and advocated establishment by the government of a "Rocky Mountain Experiment Station" to promote coal research in the West.

Opening the technical sessions with a paper on Coal Mining Methods from the Viewpoint of an Inspector, R. J. Schultz, mine inspector, Price, Utah, while stating that mines are operated much more safely than 25 to 50 years ago, expressed the opinion that the industry probably still is only 60 to 70 percent efficient in absolute accident prevention. What to do in the future is the question. Congress cannot legislate safety and seizure cannot assure it.

Stating that bosses and men are more safety conscious and are cooperating well in obtaining it, Mr. Schultz discussed recent mine explosions in Utah, pointing out that rock dusting prevented a much larger loss of life. It seems, he observed, that coal has more control over the explosion itself than over the sources of ignition. The question is whether, after adopting permissible equipment, the industry can go much farther in preventing ignitions. Gas, of course, should not be permitted to accumulate and air-powered equipment is seen as a possible out.

Discussion following the paper brought out considerable concern over the meaning and possible effects of the safety clauses in the new bituminous agreement on mine operation, on relations between federal and State authorities and on the position of certified men. Drastic changes were foreseen as a possibility by operators, while representatives of the federal inspection organization expressed the opinion that reason would be used. Doubt also was expressed as to the wisdom of some inspection standards by operators, who detailed some of the difficulties involved in getting a hearing on objections, with federal men suggesting that in such cases a written presentation should be made. Such presentations would receive earnest consideration and, on the basis of past experience, might result in modifications.

Discussion also brought out opinion that

the personal equation was a major factor in accidents. Education was seen as the answer, with officials at and in the mine as the ones who must carry the load. New and safer operating equipment was cited as another part of the answer, along with late-type safety facilities and equipment.

The bituminous industry's plan of action to protect its retail market was presented to the institute by B. R. Gebhart, vice president in charge of sales, Chicago, Wilmington & Franklin Coal Co., Chicago, and a member of the marketing committee that developed the plan for cooperation with retailers approved at the Cleveland meeting of the National Coal Association. Stating that retail merchants distribute about 120,000,000 tons annually, of which around 95,000,000 tons is used in heating dwelling units, Mr. Gebhart cited some estimates that losses to oil and gas now total 35,000,000 tons a year. A definite program is required to prevent further large losses and for that reason the marketing committee was organized to draw up a plan for cooperating with dealers to promote consumer satisfaction with coal.

## Local Retail Meetings Set Up

After presenting the plan (Coal Age, April, 1946, p. 130), Mr. Gebhart outlined steps taken since to put it into effect. The going, he said, has not been easy. The first thing necessary, it was felt, was a meeting with retailer representatives, which was attended by men from more than 30 States. As a result it was decided to proceed on the basis of local retail groups setting up organizations suited to their conditions, after which the national organization would make a contract to put into effect its part of the co-operative arrangements. The arrangements are predicated on two first-steps on the part of the retail organizations: clean delivery and 24-hour service, to be followed by cooperation in extending other services contemplated in the national plan.

The program, said Mr. Gebhart, was set back about two months by the strike but the permanent organization is being built and the plan will be put into effect soon. Discussion confirmed Mr. Gebhart's contention that an organization national in scope and management is necessary to get results in local operation. It also brought out that many communities are waiting for something like the national plan and will go along, that very small communities offer a problem and, therefore, a start may have to be made in the larger ones, with such help as practicable to the smaller for the present.

Mechanized mining is the answer to reduced coal cost but economical production must be achieved without impairing quality, declared Nelson L. Davis, manager, materials handling, Link-Belt Co., Chicago, in a discussion of modern coal preparation. The future, he stated, is good if quality is improved to meet consumer demands and if cost is kept down by efficient equipment and operation.

Outlining the characteristics of coal in the seam and impurities that may be present, including bone, Mr. Davis declared that the heavy-media process of preparation offers advantages when bone or other material difficult to separate is present. This equipment provides very close control and a minimum loss of coal in the refuse. The heavy-media process, he stated, eliminates the difficulties



R. J. Schultz (left) visits with J. R. Holt, Hayden Coal Co., while waiting to present his paper on safety.



New officers stand up with the retiring president—F. W. Whiteside (left), re-elected secretary-treasurer; D. H. Pape, president, Sheridan-Wyoming Coal Co., Inc., retiring after two years as institute president; and Paul L. Shields, vice president and general manager, United States Fuel Co., new institute head.

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encountered in cleaning mechanically mined coal with equipment hitherto available, especially where bone and other material difficult to separate at gravities less than 1.50 are present.

The float-and-sink and heavy-media processes have been used in metal and non-metallic mining for the past seven years and in the past three have been developed for coal. Now, a new cleaning unit has been developed making three products in one operation: clean coal, refuse and middlings for retreatment to increase recovery. The process has been incorporated in the flow-sheet of the Champion No. 1 plant of the Pittsburgh Coal Co., operating on middlings refuse from the first outlet of the existing primary launder washer. It comprises about 50-percent 1.50 sink, 20-percent 1.40 by 1.60 and 30-percent 1.40 float. While the test work has not been completed, densities have been maintained at any desired points between 1.30 and 1.60. The surface area of the bath is about 48 sq.ft. and the feed averages 1.50 t.p.h.

Sink in the float coal has been averaging about 0.2 percent. When operating at 1.60 specific gravity, there has been no float material in the refuse, but at gravities of 1.40 and lower the 1.60 float in the refuse has averaged about 3.6 percent. Improved results, it is expected, will result from further work.

There is no positive indication, said Mr. Davis, that heavy-media is suited to the entire size range down to zero. The recommended range seems to be about 10x $\frac{1}{8}$  in. Below  $\frac{1}{8}$  in., the test appears to be the

quality. "In some cases, it can be bypassed without cleaning. In others, it can be cleaned pneumatically, while in others the cleaning can be accomplished with either wet concentrating tables, jigs or launders. The cleaning of fine coal remains in the same category as prewar, but the advent of heavy-media indicates that manual picking of plus 4-in. coal need not be a factor in preparation-plant design from now on.

"Another advantage of the heavy-media process . . . lies in the fact that there is no effluent from such a plant and, therefore, a minimum of water is necessary."

Activities of the National Coal Association were outlined in a paper by John D. Battle, executive secretary, National Coal Association, Washington, D. C., read by Paul L. Shields, vice president, United States Fuel Co., Salt Lake City, Utah. Pointing out that coal operators face added difficulties in the future because of price increases and interruptions in production, Mr. Battle urged increased operator cooperation in the work of the association and individually to overcome industry problems, win public support and promote progress.

Mr. Battle's plea for greater industry participation in national programs was supported by Mr. Pape, who suggested that the institute broaden its scope to take in marketing and other operations and thus increase its opportunity to serve.

Wartime coal developments in Europe and research in the United States were summarized by Dr. H. J. Rose, vice president and director of research, Bituminous Coal Research, Inc., Pittsburgh, Pa. Germany,

he related, developed a method of cutting and loading coal automatically and continuously with a device known as a "coal planer." It gave 11 tons per man at the face, or about three times that possible in other European operations.

Underground gasification, said Dr. Rose, is now underway on a large scale in Belgium after considerable experimentation. Production of both a lean producer gas and a richer coal gas is contemplated in the project, supported by both the government and the operators. Germany developed several processes for the production of low-ash coal and coke for special purposes, as well as high-pressure briquetting of fines without a binder for special-purpose briquets. By the end of the war, synthetic liquid-fuel production, as a result of bombing, had dropped to practically nothing from a peak of 100,000,000 gal. per month in 1944. The Bergius and Fischer-Tropsch processes were employed. Germany also used oxygen for producing higher-than-normal gas but did nothing remarkable in coking or coal utilization. In general, the Germans were good chemists but poor engineers.

Switzerland, Dr. Rose reported, has advanced considerably in the development of powdered-coal turbines, radiation heating and the use of the heat pump. With the latter, heat is taken out of cold water and boosted to 165 deg. for heating, the yield with conventional room equipment being 3 B.t.u. for each B.t.u. of electricity expended in operation. With panel heating, the Swiss believed, the yield could be raised to 5 B.t.u. per B.t.u. of electricity.

#### U. S. Coal Research Program

Turning to American research, Dr. Rose stated that 250 companies now are supporting the program. The production represented, at 4c. per ton, is over 220,000,000 tons. Other contributors include railroads, manufacturers of heating equipment, a casualty company and others. Several of the railroads are heavily supporting research to develop a coal-fired gas-turbine locomotive, which work is making excellent progress.

In view of its importance, 47 percent of the organization's general funds are devoted to home and commercial heating. Results are being achieved in this as well as in industrial and other work. This reflects the growth in investment in research, which for the present twelve months is \$375,000, exclusive of special funds for locomotive development. Support is increasing all the time with the total in 1946 about half a million dollars. This is still a modest sum, Dr. Rose pointed out, in view of the ground that needs to be made up, the value of the product to the industry and the sums spent by other industries. More support, he concluded, means a broadened program and greater benefits to the industry.

Suggesting that operators in the West work for a "Rocky Mountain Experiment Station," Mr. Pape indorsed Dr. Rose's statement that more support would bring more benefits. Stating that some research is properly the job of industry and other that of government, he urged coal men to increase their own efforts and to work for adequate appropriations for work by the government.

Electrical safety and continuity of service involve problems connected with both a.c.



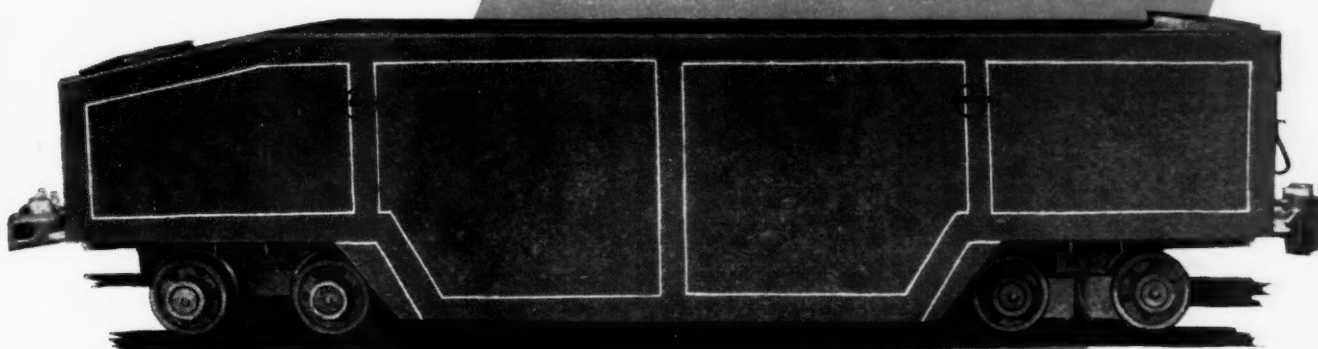
Posing before doing their stuff—Myron D. Williams (left), deputy coal-mine inspector; Hubert E. Risser, coal-mining section, National Safety Council; and A. F. Lyster, Socony-Vacuum Oil Co.



Speakers and president get together—front row, D. H. Pape (left), institute president, and G. R. Harris, Hayden Coal Co.; rear row (left to right), Dr. H. J. Rose, Bituminous Coal Research, Inc.; Nelson L. Davis, Link-Belt Co.; D. R. Hoopes, Westinghouse Electric Corp.

# 300

## NEW EIGHT WHEEL MINE CARS GO ON



# TIMKEN BEARINGS



These 8 ton capacity all-steel rotary dump cars were designed and built by Irwin Foundry & Mine Car Company, Irwin, Pa. for Allegheny Pittsburgh Coal Company. All wheels are mounted on Timken Tapered Roller Bearings. The 300 new 8 ton cars have replaced 500 old 3½ ton cars (also Timken Bearing Equipped) at Springdale Mine, Logans Ferry, Pa.

Irwin Foundry & Mine Car Company has used Timken Bearings for many years; has built thousands of mine cars on them; knows they can be depended on for efficient, trouble-free, economical service and long life.

The experience of this company is typical of that of many other leading car builders and more than a thousand mine operators.

Make sure the trade-mark "TIMKEN" is stamped on every bearing that goes in your mine cars — then you will be sure of getting all the bearing advantages so many others enjoy.

**THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO**



and d.c. distribution, said D. R. Hoopes, supervisor of engineering and service, Westinghouse Electric Corp., Salt Lake City, Utah. A.c. is the least difficult of the two. D.c. is not so easily protected and, therefore, constitutes the bigger problem. One reason is that coal is a conductor and thus a wire can fall and a current can flow, 50 amp. for example, without tripping the breaker. It is expected, said Mr. Hoopes, that equipment will be developed to take care of such situations.

Safety and continuity of service have been improved by such developments as permissible motors and controls, power centers, dry-type transformers, which have advantages over the non-inflammable-liquid type, and ignitron rectifiers. More reliable transformers favor Y connection rather than delta. If the Y connection is not used, grounding of the system is necessary. A.c. protection should include overload, reverse phase, phase failure and ground relay. The latter is the most important. Y connection provides more protection because there is a much lower voltage to ground.

Showing by example methods of protecting a.c. and d.c. systems, including sectionalizing to promote continuity of service, Mr. Hoopes stressed the necessity of good bonding and observed that in the case of trolley wire the emphasis should not be so much on protection against falling but rather on putting it up so it cannot fall.

### Opening a Lower Seam

Opening and developing the No. 4 Hayden mine, described by G. R. Harris, general manager, Hayden Coal Co., Denver, first involved drilling to determine if a lower seam reported to exist actually was present. Having proved its existence, the shaft serving the original mine was extended down to the lower seam 180 ft. below. Time required to sink was 60 days and to save time three drills were employed with 2-, 4- and 6-ft. steels to reduce changing. For temporary ventilation one compartment of the shaft was sealed for an intake, with a return through the others. The air shaft was raised, using two shaker conveyors in tandem to stow the rock in a room and eliminate hoisting it to the surface.

Pitch at the shaft bottom is 30 percent, flattening out to 20 percent 1,000 ft. away. Each panel is separate with its own air split. Panels are 3,000 ft. long and rooms 300 ft. To cut down grade rooms were driven at a 45-deg. angle. Because of water in the old works above, pillars are being left until later.

The bottom is steel timbered and concreted for life and permissible floodlights have been installed for illumination. Rail weight is 60 lb. on mains and 40 lb. on panels, with creosoted ties—no failures in four to five years. The electrical installation was designed for safety and efficient service and all equipment is permissible. Concentration at present is on development but despite this, using shaker conveyors, 70 men underground average 800 to 900 tons a day. Facilities include temporary and permanent chemical toilets underground (Coal Age, January, 1946, p. 96). The results, Mr. Harris reported, have been good. The mine has been kept clean in that respect and this has helped in getting good housekeeping otherwise.

### Rocky Mountain Officials

Paul L. Shields, vice president and general manager, United States Fuel Co., Salt Lake City, Utah, was elected president of the Rocky Mountain Coal Mining Institute at the Denver meeting. Mr. Shields succeeded D. H. Pape, president, Sheridan-Wyoming Coal Co., Inc., Monarch, Wyo. Fred W. Whiteside, Denver, was re-elected secretary-treasurer. Other officials were chosen as follows:

**Vice presidents**—Colorado, John H. Emrick, Sullivan Machinery Co.; New Mexico, J. R. Barber, St. Louis, Rocky Mountain & Pacific Co.; Wyoming, L. M. Pratt, Kemmerer Coal Co.; Utah, R. G. Heers, Kaiser Co.

**Executive board**—Colorado, George C. Watson, Domestic Coal Co.; G. R. Harris, Hayden Coal Co.; New Mexico, F. W. Koelling, Phelps Dodge Corp.; Horace Moses, Kennecott Copper Co.; Wyoming, A. F. Perry, Sheridan-Wyoming Coal Co., Inc.; John Hovach, Union Pacific Coal Co.; Utah, D. C. Frobes, Frobes Equipment Co.; W. R. Wilson, Atlas Powder Co. **Montana institute representative**—Walter Johnson, Roundup Coal Mining Co.

Discussing reserves, characteristics and production history, Ira R. Sigman, Thomas A. Edison, Inc., Denver, in a paper read by Charles M. Schloss, Shubart & Schloss, pointed out that Colorado anthracite has possibilities in metal refining and other uses where a high-carbon product is necessary, as well as in blending in coking. He urged study of the possibilities by operators and the U. S. Bureau of Mines.

Cooperation between supplier and user is necessary for maximum results in the application of petroleum products, declared A. F. Lyster, manager, industrial lubricating department, Socony-Vacuum Oil Co., Kansas City, Mo. Outlining the theory of lubrication, Mr. Lyster observed that getting the right lubricant to the right place at the right time assures the best results.

Petroleum applications also include fuels, which are intimately tied up with and must be considered in lubrication; metal working and machine-shop operation; protection of equipment, such as slushing; timber treatment and dust allaying. Continuous education must supplement cooperation, Mr. Lyster concluded, to insure continued logical, economical and efficient application of petroleum products in each plant.

More information is needed to properly evaluate possibilities, said Myron D. Williams, deputy coal-mine inspector, Trinidad, Colo., in opening a discussion of working contiguous coal seams. Offering several examples of operation where the interval is 40 ft. or more and also less than 40 ft., Mr. Williams observed that it appeared that

successful operation involved pillars of the same size, columnization of pillars in the upper and lower workings and keeping the top workings ahead of the lower, with provisions as necessary to take care of special conditions. Each entry should be sealed to prevent ventilation difficulties. Pitch adds to the problem and roof control is especially important in multi-seam mining. Provisions for handling gas, especially extinctive gases that might be derived from old workings, is important.

### Mine Upper Seam First

With an accurate map and no water in the upper seam, Mr. Williams saw a chance for working a lower seam when the upper has been mined. Pillars and development in the upper seam must be followed in the lower. He felt, however, that working an upper seam when the lower had been mined was not possible with safety and economy. Flushing with culm, he concluded, has given results in the anthracite region and might be the answer to working contiguous seams.

Discussion brought out considerable interest in further information on the problems involved in working two or more seams and in Mr. Williams' comment on the need for additional data on subsidence.

Safety has very lately assumed a much greater status economically, said Hubert E. Risser, staff representative, coal-mining section, National Safety Council, Chicago, in an address on the organization and functions of the section. Safety not only is important economically and from the human standpoint, he continued, but from its effect on relations with employees and with the public.

One major part of the section's work, said Mr. Risser, is informational and educational material, including a consulting service to assist members with specific problems. The second is a plan which if adopted will reduce coal-mining accidents. Elimination of physical hazards cannot alone result in maximum safety. It is necessary that every group concerned with coal mining combine forces to that end. Accidents arise from hazards and also from individual actions. Therefore, a safety program must consider both. To promote cooperative action the coal-mining section proposes that all groups join forces and set up joint State and district organizations, taking in operators, State officials, labor organizations and federal safety and inspection men so that all will be in better position to proceed directly to the goal. The job, said Mr. Risser, is not an easy one, but cooperation will make it move faster.

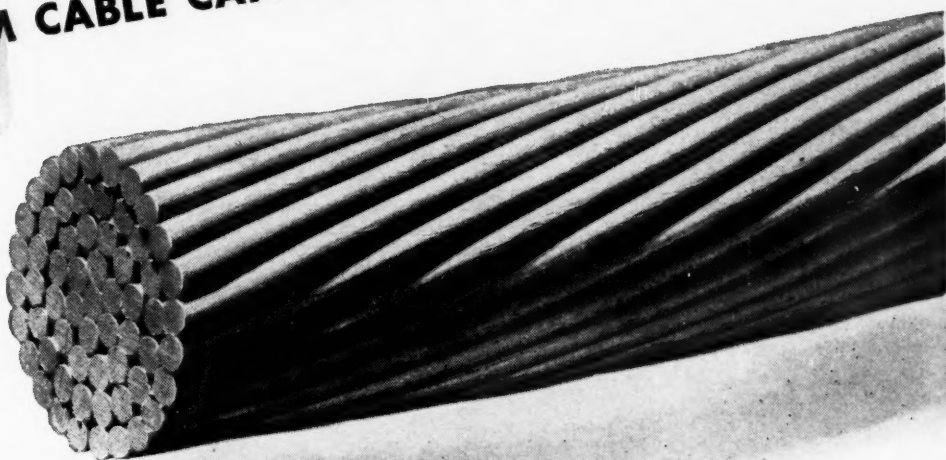
### Stoker Picture Discussed At Colorado Springs

Problems facing the stoker industry and ways and means of meeting them were the subject of the 1946 annual meeting of the Stoker Manufacturers' Association, held at Colorado Springs, Colo., June 3-4. The association adopted a program calling for increased advertising and greater emphasis on merchandising of automatic heat with coal stokers to meet the situation outlined by Walter Sormane, its president.

"During the war years," said Mr. Sormane, "we witnessed how coal prices

# Are your Feeder Cables being attacked?

HERE'S EVIDENCE, DATED 1905, THAT ALCOA  
ALL-ALUMINUM CABLE CAN HANDLE THE TOUGH JOBS



Still in service after forty years, this Alcoa All-Aluminum Cable is delivering power just as efficiently as the day it was installed. It's a mill feeder, but similar cables are serving coal mines equally well.

Aluminum is highly resistant to the acid corrosion encountered in coal mines. That assures long life for these cables.

Why not make those extensions that have been held up by shortages of other materials?

Alcoa can make prompt shipment of all-aluminum cable in circular mil sizes to meet your requirements. \*For engineering advice on feeders, get in touch with the nearby Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, 1763 Gulf Bldg., Pittsburgh 19, Pa.

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# ALCOA ALUMINUM

IN EVERY COMMERCIAL FORM



steadily increased to the point where today coal heat holds little, if any, price advantage over oil and, in most cases, even gas. During this same period, the quality and preparation of coal deteriorated greatly, causing a great deal of consumer dissatisfaction. There was a scarcity of oil fuel during the war and the public was not too unwilling to put up with the discomfort and inconvenience that ensued because of the war emergency, and also for patriotic reasons. But today, one year after V-E day, while there seems to be an ample supply of fuel oil and gas, we are experiencing an even more acute shortage of coal than there was during the war, due to union demands and government policy.

### Stoker Sales Retarded

"The constantly increasing cost, the decline in quality of preparation, the uncertainty of available supply, coupled with the unpopularity that coal as a fuel and as an industry has won for itself is swinging public sentiment away from coal toward other fuels. There is no need to conceal the fact that since early this year sales of stokers to the consumer have slowed down substantially. . . It is really astonishing what a change has occurred in our picture within the short period of a few months.

"The huge demand for stokers built up during the four years of war and which had every indication of promising a prolonged era of high activity in our business has suddenly vanished as if by magic. At the risk of appearing unduly pessimistic and of being accused of casting gloom over the convention, I feel that the seriousness of our present situation cannot be overemphasized.

"We cannot hope to induce the public to continue to buy our stokers unless it can be assured a constant supply of properly prepared coal at prices that offer an incentive to use coal in preference to other fuels. The recent coal miners' strike, which has caused such huge losses and so much suffering was, in my opinion, the last straw that broke the camel's back.

### Coal-Industry Action Asked

"A great deal of the public acceptance of 'automatic heat with coal' we have built up in years past has now been lost. What is to be done about it? How is this condition going to be remedied? I fear that it is a bigger job that we in the stoker industry can tackle by ourselves. If the coal industry has any interest in rescuing its rapidly vanishing domestic market, it had better awaken quickly while there is still time and for once realize that to promote public acceptance it must do more than eulogize the historic background of coal or defend the standard of living of the coal miners."

Other events on the program included reports of other officials, committees on advertising and public relations and engineering and research, panel discussions of government regulations, the labor and materials outlook, production problems and sales and merchandising, plus a discussion of "What's New in Heating" and brief comments by A. R. Stock, Sinclair Coal Co., Kansas City, Mo.; Cal Grover, Anthracite Industries, Inc., New York; and Dr. H. J. Rose, Bituminous Coal Research, Inc., Pittsburgh, Pa.

## Mining Methods, Industry Relations Feature Bluefield A.I.M.E. Meeting

Conveyor mining, the coal industry's relation to oil and gas, new applications of a.c. power underground, freezeproofing of coal, community planning and industrial limestones of western Virginia highlighted the meeting of the Central Appalachian Section of the A.I.M.E., May 24-25, at Bluefield, W. Va.

The meeting was opened by A. S. Schoffstall, International Nickel Co., Huntington, the section chairman. Roland C. Luther, vice president, Peerless Coal & Coke Co. and A. W. McThenia, vice president, Acme Limestone Co., were chairmen of the first technical session. Chairmen of other sessions included Thomas H. Clagett, superintendent and chief engineer, Pocahontas Land Co.; R. H. Morris, vice president, Gauley Mountain Coal Co.; J. A. Hagy, mine superintendent, Jewell Ridge Coal Corp.; and L. I. Cothorn, head, mining engineering department, Virginia Polytechnic Institute.

W. E. E. Koepler, secretary, Pocahontas Operators' Association, was toastmaster at the dinner and introduced the guest speaker, J. Robert Van Pelt, director of public relations, Battelle Memorial Institute. J. V. Sullivan, secretary, West Virginia Coal Association, spoke at the luncheon Friday.

Presenting a paper on "Freezeproofing Coal," W. A. Staab, mining engineer, Calcium Chloride Association, made the follow-

ing general suggestions on freezeproofing coal loaded into railroad cars: (1) before loading the cars, clean out all snow and ice; (2) if a solution treatment is used (4½ lb. of calcium chloride per gallon of water) try to dewater the coal to eliminate drainage; (3) on spray nozzles use at least 40 lb. pressure (some operators spray the insides of cars before loading; (4) where there is drainage from the cars, flake applications have been found best and are likely to be more effective if applied by machine than by hand; (5) even with flake application, dewater the coal as much as possible and apply the flake as the coal moves by conveyor; and (6) where dry coal is mixed with wet, apply the flake to the top of the wet coal on the conveyor before the dry coal is added.

The cold weather of 1945, said Mr. Staab, highlighted the difficulties and extra expense resulting from coal freezing in cars and indicated the value of preventing freezing in transit rather than thawing at the destination. Unloading frozen cars costs \$3 to \$25 more per car than normally, and at one dock unloading was slowed from 60 cars per hour to 12 cars per hour. In addition, use of torches damages many railroad cars (principally the paint), and overheated thawing sheds even damage some cars (mainly the rubber hose and grease packing).

According to Mr. Staab, there is entirely



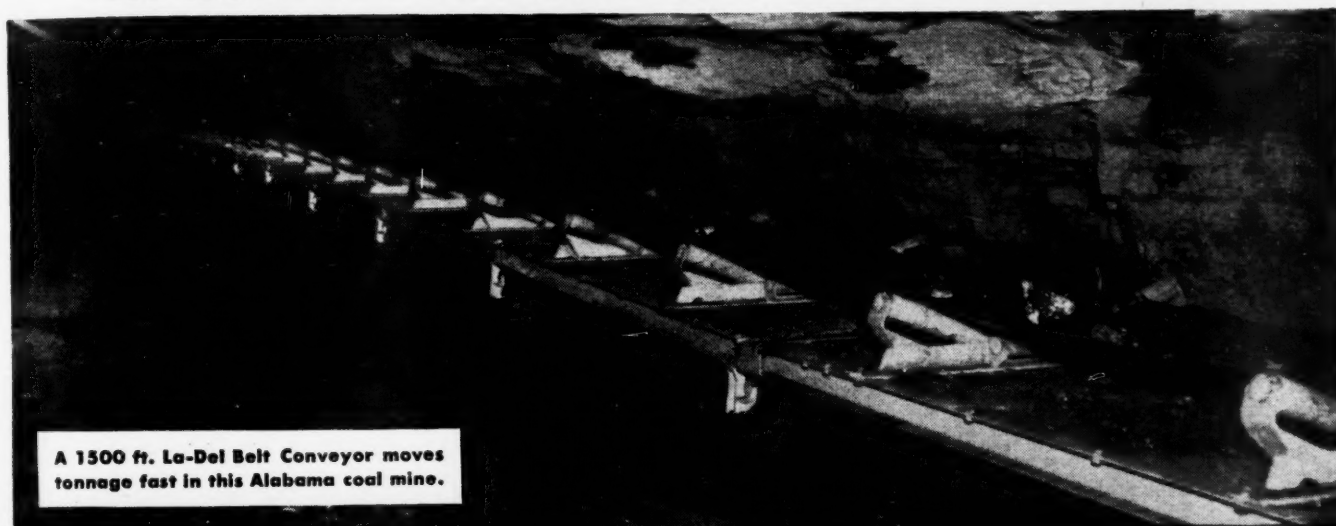
Chairmen and speakers at the opening session Friday morning included, left to right: A. W. McThenia, Dr. Byron Cooper, W. A. Staab, A. S. Schoffstall and Roland C. Luther.



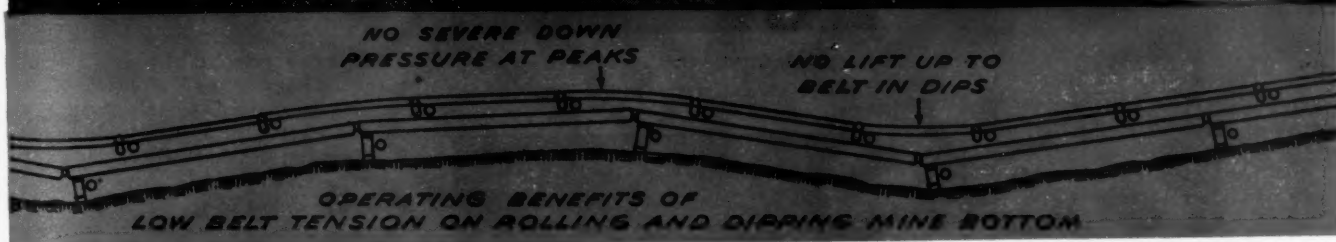
Participating in the Friday afternoon technical sessions were, left to right: R. H. Morris, Veleair C. Smith, Thomas H. Clagett and C. E. Silling.

# TONNAGE

*MOVED QUICKLY...ECONOMICALLY*  
**IN ROLLING BOTTOM AND CLOSE TIMBERING**



A 1500 ft. La-Del Belt Conveyor moves tonnage fast in this Alabama coal mine.



## **LA-DEL CONVEYORS**

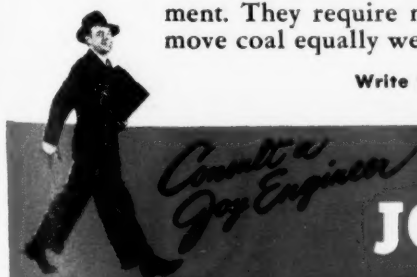
**ROOM, GATHERING AND HAULAGE TYPES**

La-Del Conveyors on the job mean smooth, continuous flow of coal from the face. Tonnage goes up . . . production costs go down because La-Del Conveyors *operate efficiently* even under conditions that usually demand special equipment. They require minimum head room and move coal equally well over rolls and dips.

Write for bulletin



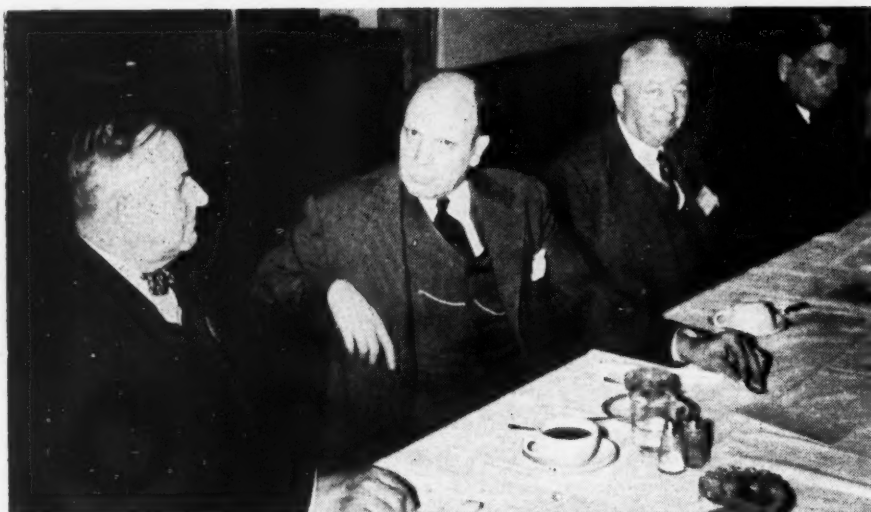
FOR ALL SEAMS  
**LA-DEL SHAKER CONVEYORS**



**LA-DEL Division**

**JOY MANUFACTURING CO.**

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.



Shown at the speaker table at the dinner meeting are, left to right: W. E. E. Koepler, toastmaster, J. Robert Van Pelt, guest speaker, A. S. Schoffstall and R. H. Morris.

too much "indifferent" freezeproofing, but because of the many variables, including rain and snow in transit, definite quantity standards of chemical have not yet been set by the Calcium Chloride Association though they are now in the making. Employing slides, he exhibited tables of quantities recommended by the Bituminous Coal Research, Battelle Memorial Institute and the Solvay Process Co. Under usual conditions, he said, quantities suggested by a table ranging from 9 to 18 lb. per ton of coal for 9-percent surface moisture at various temperatures should provide good freezeproofing.

The chart and graph slides included tests on oil and plain salt and brought out a curious fact observed in coal-cube laboratory tests with salt—when salt water freezes, the ice has a strength greater than ice from pure water. That was not the case with calcium chloride, Mr. Staab stated, and predicted that freezeproofing will become a positive requirement in years to come.

In discussion, Mr. Staab explained that some byproduct superintendents claim calcium chloride damages oven linings but that they never can point to definite evidence. It is known that the English have had some difficulty in using alumina brick but experienced no trouble with silica brick such as we use.

Establishment of the State of Virginia as one of the leading producers of industrial limestone and the Appalachian Valley as a large producer when the northern Virginia reserves are depleted was predicted by Byron Cooper, Department of Mining Geology, Virginia Polytechnic Institute, in a paper entitled "Industrial Limestones of Western Virginia." A study begun in 1942 covering the area between Glenlyn and Roanoke and through Tazewell County has disclosed limestones in large quantities and of high purity heretofore unknown to geologists, he said. One large limestone operation was recently opened and another is now under development in these areas.

Dr. Cooper called particular attention to limestones of high-calcium content in the vicinity of Richlands and near coal mines producing high-quality low-sulphur fuel. It should be possible, he suggested, to use the two locally to make lime for shipment as far as New York State in competition with lime



Fred R. Toothman (left), who spoke on conveyor mining, talks with J. A. Hagy.



J. O. Cree (left), who also presented a paper at the Saturday morning session, is snapped with L. I. Cothorn.

plants operating in northern Virginia.

Profit to coal companies from better relations with their employees through community planning that includes design of dwellings and layout of company buildings, was the theme of a paper, "The Economy of Community Planning in the Mining Indus-

try," presented to C. E. Silling of Silling, Tucker & Silling, architects, Charleston, W. Va. Not only should mining engineers not be burdened with designing houses and buildings, but specialists in the field know how to get better buildings for less money, Mr. Silling said. He advocated building houses that would attract miners' families and selling those homes to the miners, and suggested mining companies secure F.H.A. loans for these planned community dwellings.

In discussion, Mr. W. E. E. Koepler pointed out that coal operators have been abused for their efforts in planning better communities at their mines, and as a result, the Pocahontas operators have for some years been advocating that miners own their own homes. In that field hundreds of miners, through independent real estate operators, have built homes on one-acre tracts that are usually located some distance from the mines.

Commenting on the problem, Mr. Luther declared that modernizing old houses at a mining property presents tremendous difficulties and he posed two questions: (1) How can a \$5,000 house be built and then rented at the rate Lewis demands? (2) If men don't want to buy the houses, how can they be persuaded? S. D. Brady, Jr., mining engineer, Baltimore & Ohio R.R., said that from new mines in Webster and Nicholas Counties of West Virginia about 2,400,000 tons was mined last year but that the coal companies have built only about a dozen houses. Independent real estate operators are building houses for sale to the miners.

### Fuel Industry Cooperation Urged

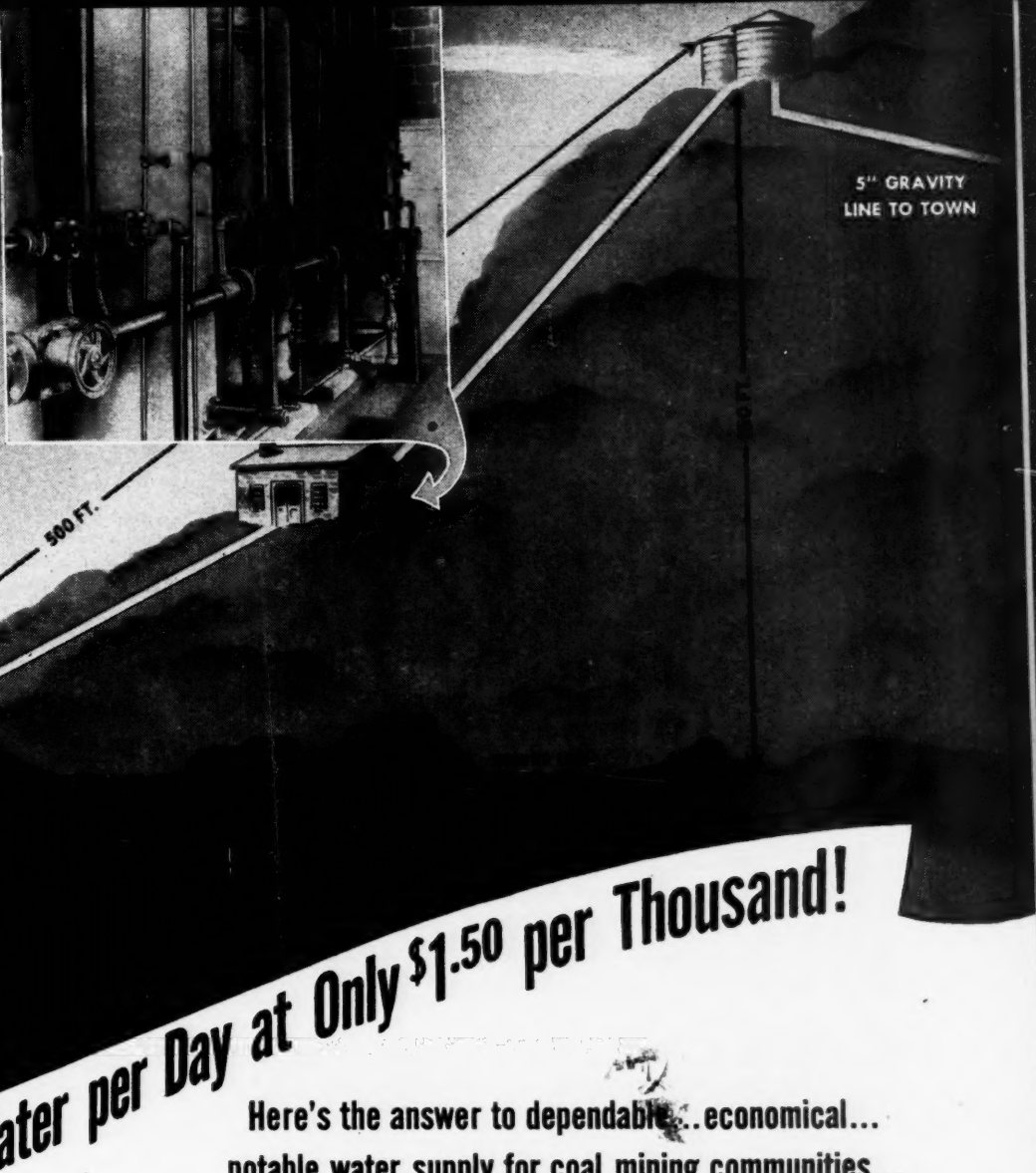
The coal, oil and natural-gas industries are all in the same business of supplying fuel and would profit by cooperating instead of cutting each others' throats was the theme of a symposium conducted by Veleair C. Smith, consulting engineer and geologist, Charleston. He mentioned several reasons "why coal has missed the boat": (1) Although oil and gas run the show for coal, men of the coal industry know little about oil and gas problems, while the reverse is true as evidenced by the fact that coal magazines are read in oil and gas offices. (2) Coal research has been extremely provocative to oil and gas and of little value to coal. It is not good business to spend money for research to make gasoline from coal while the cheaper method is to make it from natural gas. (3) Coal should spend its research money by developing beneficiation comparable to the refining, stripping, desulphurizing and so on of oil and gas and for research on manufactured gas to go into natural-gas mains.

Mr. Smith called attention to the fact that the top burning efficiency of coal in large power units is about 81 percent as compared with 77 percent for gas. Central heating with coal, plus the use of electric ranges, is superior to the usual domestic use of gas. Mr. Smith emphasized that the fuel industry of this country can be strong only if it is unified, and he recommended that coal operators study the testimony and findings of the Federal Power Commission investigation now being completed. Coal is a better fuel than one thinks, he said.

In discussion, C. E. Lawall, Chesapeake & Ohio R.R., remarked that by increased research and better publicity, the latter through the Bituminous Coal Institute, the

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Now...  
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...9,000 gals. Potable Water per Day at Only \$1.50 per Thousand!

Here's the answer to dependable...economical...  
potable water supply for coal mining communities...

## FILT-R-STIL\*

### ION-EXCHANGE WATER DEMINERALIZATION UNIT

**This was the problem**—David, Kentucky... water brackish and unpotable. Community was forced to truck in approximately 8,000 gallons of water per twenty-four hours. This water was pumped into a large reservoir tank feeding the town of about 100 homes by gravity distribution system.

**Here's a workable answer** provided by FILT-R-STIL...Cyanamid engineers studied the problem and made

recommendations to meet the specific conditions, which led to the building and installation of a complete FILT-R-STIL ion-exchange water demineralization unit to...

1. Provide the potable water capacity required for the community.
2. Produce potable water at less cost than trucking it in.
3. Enable community to be independent of outside water sources.

#### HOW THE FILT-R-STIL WORKS

FILT-R-STIL units consist of four treating towers containing beds of IONAC\*\* Resins which remove the dissolved minerals from water. Water is fed under pressure and delivered through a conductivity cell which indicates the quality of water being produced. When resins are exhausted a regenerative system for the reactivation of the IONAC Resins restores the unit to full operating efficiency.

#### HAVE YOU A POTABLE WATER PROBLEM?

Cyanamid is prepared to work with you "on location" to help you achieve a practical solution. For further details, and descriptive literature on ion-exchange water demineralization principles, units, and applications, consult with...

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coal industry is fast correcting its outstanding weaknesses. The coal industry will be active long after oil and gas are out of the picture, he declared. George E. Keller, Commercial Testing & Engineering Co., Charleston, explained that the presence of hydrogen in gas accounts for pulverized coal and even some stoker installations exceeding the efficiency of gas. The hydrogen burns to water and heat is not extracted from the resulting steam.

Average tons per face man for a seven-hour shift was 13.6, and per man in the section 10.5, at 19 hand-loading chain-conveyor mines of the 30 mines visited by Fred R. Toothman, graduate student, West Virginia University, in preparation for his thesis, "Trends in Conveyor Mining In West Virginia." Comparative production for hand-loaded shaker-conveyor mines was 16.3 and 12.9 tons respectively, and for duckbills 20.65 and 13.92 tons. The duckbills studied were operating in an average bed height of 39 in., and they were about equally divided between room work and development. Place width did not exceed 30 ft.

While conveyors were working in beds ranging from 30 to 100 in. in thickness, no correlation between type of conveyor and bed height, or between bed thickness and tons per man-shift on the conveyor sections was found. This study, made partly in 1941-42, and finished in 1945-46 after the speaker's military service, was not confined to 100-percent conveyor mines because there were not enough in the state in 1941. While in 1934 there were only four, there has since been a steady increase and 38 such mines were reported in 1945. The study covers conveyor sections in 30 different mines, and in all cases the system employed was the conventional room-and-pillar.

Mr. Toothman observed the need for a power-operated truck low enough and of practical dimensions and weight to carry men and materials to working faces in thinner beds. In one mine in 56-in. coal a hand-loaded chain-conveyor section was producing 26 tons per face man, but paying on a tonnage basis instead of the day rate as in all the other mines visited. Rooms in that mine are driven 40 ft. wide and a 20-ft. slab of the pillar is brought back.

Face junction boxes with air circuit breakers to displace fuses and a single-phase 220-volt coal drill with its line-starting switch located at the face junction box were described by J. O. Cree, West Virginia Engineering Co., in his paper entitled, "Some New Installations of A.C. Power Underground." A 440 volt-Y alternating current with grounded neutral and with all power wires properly insulated is as safe as 220-volt-delta a.c. and safer than a 250-volt d.c. system that includes exposed trolley wires, he stated. Voltage from a 440-volt-Y line to ground is 256 to 260 volts.

A face junction box with three circuit breakers costs about \$350, and while those already in use are not permissible, permissible can be made. The electric drill has a 5-conductor cable; two wires are used for the power, two for the control line from the box to the remote starting switch on the drill, and one serves as a ground. He also described a 150-kw. air-cooled oil-less three-phase distribution transformer recently installed underground that, including a built-in secondary circuit breaker, weighs only 2,250 lb. It is 25½ in. high, with a base that

measures 37 in. wide, and 87½ in. long.

As an example of the low power consumption with alternating current, Mr. Cree cited a 5-year-old a.c. full-conveyor mine that produces 12,000 tons per month with a 5,000-ft. main belt. Total power requirements average 2.75 kwh. per ton. At another mine, changing the working voltage on a 5,000-volt underground lead-sheathed cable from 2,300 volts to 4,000 volts resulted in all splices failing, one after another. By connecting the lead sheaths around the splices with No. 6 copper wire the splice failures were stopped.

At Friday's luncheon, the guest speaker, J. V. Sullivan, secretary, West Virginia Coal Association, described the achievement of three great engineers who figured in Virginia and West Virginia history—Colonel William Bird, founder of Richmond, Va.; Thomas Lewis, the first county surveyor of Augusta and Rockingham Counties, Va.; and Claudius Crozet who engineered what is now the Chesapeake & Ohio R.R. through the Blue Ridge Mountains. Mr. Sullivan also pointed out that much credit is due the states for the constantly improving coal-mine inspection service they have rendered over the years. While he does not detract from the good record of federal inspection,

he does object to comparing the years 1916-17-18 with 1942-43-44 as has been done to indicate the achievements of federal inspection. Fatalities per million tons were also much less in the years 1938-39-40-41 than they were in the years of 1916-17-18.

West Virginia miners averaged \$2,885 earnings for the year ending June 30, 1945, and for January of this year the U. S. Bureau of Labor Statistics reported the average miner's weekly earnings to be \$54.23, which in the 155 occupations listed was exceeded only by locomotive builders and petroleum refiners, Mr. Sullivan also said.

Lack of trained men is at present the limiting factor in an attempt to speed research in the coal industry said J. Robert Van Pelt, director of research education, Battelle Memorial Institute, guest speaker at the dinner. In the prewar years the chemical industry was spending 3 percent of its income on research, while the average for all industries was 0.1 percent. Coal would have spent \$5,000,000 on research if it had used just that average. Public relations must be based on truth and realities, he said, and although the industry has made wonderful progress, all the public knows, however, is where progress has not been made.

## W. Va. Electrical Institutes Review Coal-Mining Problems

Preparation-plant electrical equipment, rectifier substations, deepwell turbine pumps and brush maintenance were subjects at the third annual joint meeting of the New River & Winding Gulf Electrical & Mechanical Institute and the West Virginia Section of the American Institute of Electrical Engineers held at Beckley June 13. C. C. Ballard, master mechanic, the New River Co., Mount Hope, was chairman of the afternoon technical session and toastmaster at the dinner, at which H. P. St. Clair, assistant operating engineer, American Gas & Electric Service Corp., New York, spoke on "Electric Power for War and Peace."

For the modern preparation plant, transformers-on-pole power units, wired-on-the-job control equipment and open motors are things of the past was the conclusion presented by J. T. Bailey, electrical engineer, mining division, General Electric Co., in his slide-illustrated talk, "Design and Application of Electrical Equipment for Coal Preparation Plants." Introductory to his main theme, he reviewed the history of coal cleaning. The modern plant, he said, requires from 2 to 5 hp. per ton-hour of capacity and the electrical-equipment cost is usually between 7½ and 10 percent of the total cost of the new plant.

Plants may be fed by an outside master unit substation consisting of a three-phase transformer with breaker cabinet attached or by an indoor load-center unit consisting of a three-phase oil-less transformer with cabinets attached for breakers and controls. In very large plants it is advisable to have one or more of the inside load-center power units and have a factory-built control cabinet in each section or department of the plant.

Totally enclosed fan-cooled motors solve all major problems of dust and moisture,

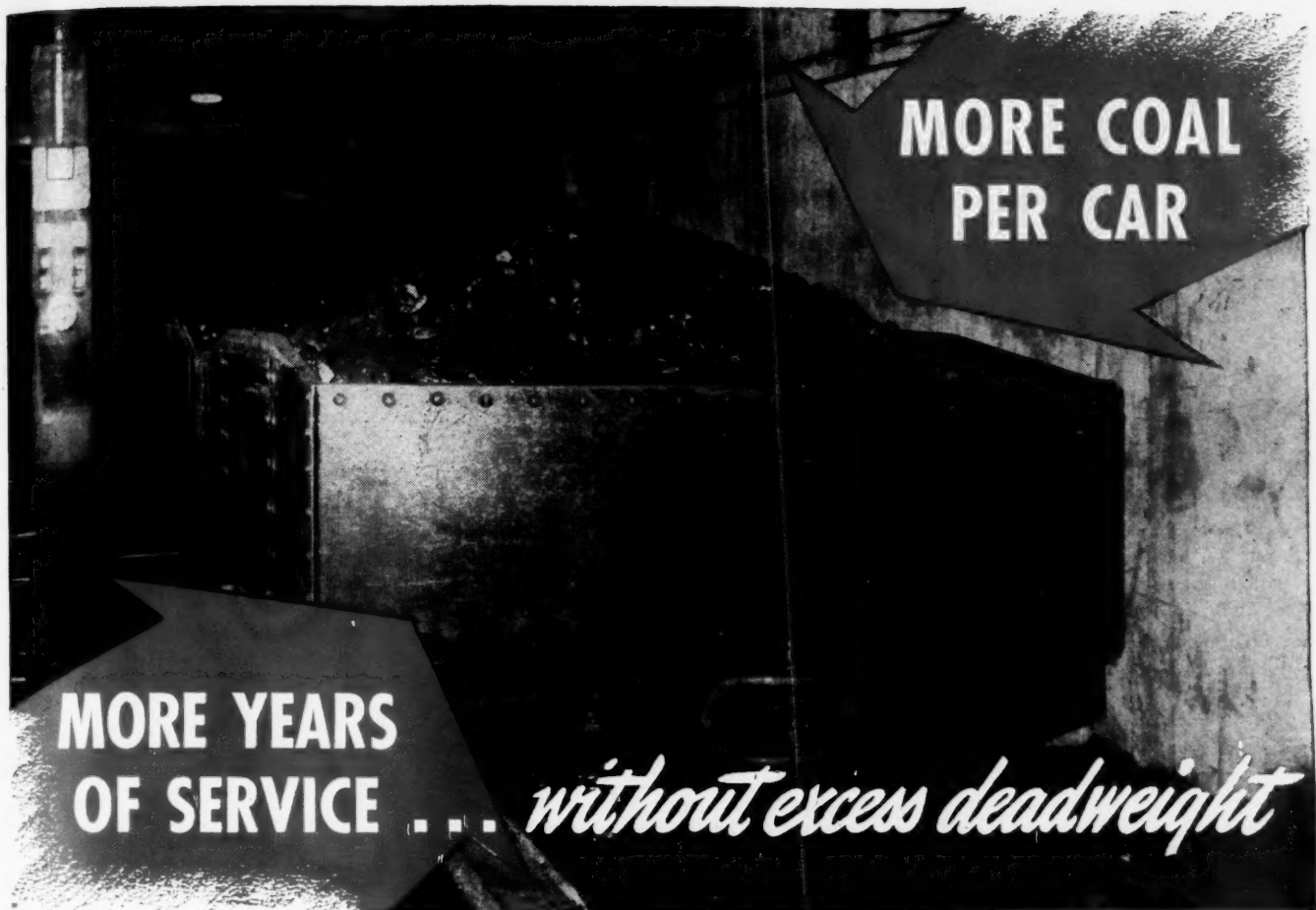
Mr. Bailey said. While many drives of the plant can be handled by normal-torque motors, high-starting-torque motors are necessary for the smaller conveyors and slip-ring motors for the larger conveyors. Electronic rectification and control for special d.c. motors provide a wide range of speed for feeders such as required for accurate blending of the finished sizes.

Direct current will probably retain its usefulness for many years to come, said O. K. Marti, consulting engineer, Allis-Chalmers Mfg. Co., in a slide-and-crayon-illustrated talk entitled, "Design and Application of Mercury Arc Rectifiers."

Slides included photographs of excitron-type portable substations for underground mining service. The excitation anode of an excitron rectifier terminates a few inches above the mercury pool, and at starting, its ignition is secured by a solenoid that splashes mercury up against the lower end. Ignitron rectifiers make use of a high-resistance electrode which touches the mercury pool. Mr. Marti showed how grid circuits can be used for voltage control, for interrupting overload current within one-tenth of a cycle and for frequency changers to obtain power coupling between 60-cycle and 25-cycle systems. Lack of uniformity in certain wartime materials used in building sealed tubes caused some difficulties which should now be overcome, he pointed out.

In introducing Fenmore E. Dunn, hydraulic design engineer, A. D. Cook Inc., who spoke on "Factors Influencing Design of Vertical Pumps," Mr. Ballard said in the New River field water pumped per ton of coal mined usually ranges between 1,000 and 1,500 gal.

Since increased pressure calls for increased diameter and diameter is limited, it is neces-



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Speakers and officers at the Beckley meeting include, left to right, front row: Allen Garrett, Jr., electrician, New River Co. and secretary of the N.R. & W.G.I.; J. T. Bailey, electrical engineer, mining division, General Electric Co.; C. O. Ballard, master mechanic, New River Co., and chairman of the local program committee; H. L. Lindsey, Charleston Electric Co., chairman of the program committee for the West Virginia Section of the A.I.E.E. Back row: I. M. Page, chief electrician, Eccles mine, Koppers Coal Division, and president of the N.R. & W.G.I.; O. K. Marti, consulting engineer, Allis-Chalmers Mfg. Co.; R. F. Norwood, engineer, Chesapeake & Ohio Telephone Co. and secretary of the A.I.E.E. section; Fenmore E. Dunn, hydraulic design engineer, A. D. Cook Inc.; E. M. Hansford, electrical engineer, Electro Metallurgical Co. and chairman of the A.I.E.E. section; P. D. Manbeck, vice president, National Carbon Co.



Shown at dinner are: left to right, Glen B. Southward, American Mining Congress; C. C. Ballard, master mechanic, New River Co. and toastmaster; H. P. St. Clair, assistant operating engineer, American Gas & Electric Service Corp., who spoke on "Electric Power for War and Peace."

sary usually to add several stages, Mr. Dunn said. However, adding stages does not increase the capacity. Pumps are rated at the capacity at which the efficiency is a maximum and the range of high efficiency should be as wide as possible. The operating head should be considerably less than the maximum of which the pump is capable so that some slight external factor will not stop the flow of water.

To prevent cavitation a design must avoid low pressure points where water would boil. Cavitation reduces capacity, causes severe corrosion and can be the reason for noise and vibration. Another important factor relating to vibration is hydraulic thrust. In operating a pump 200 to 300 ft. deep it is necessary to control hydraulic thrust so as to maintain a certain minimum tension on the line shaft. Only by proper tension is whipping between bearings minimized or eliminated, Mr. Dunn pointed out.

In the deeper settings, elongation of the shaft due to hydraulic thrust is an important factor. In a 300-ft. pump it can be as much as  $\frac{1}{8}$  in., while for pumps deeper than that and with heavy loads as much as  $\frac{3}{4}$  to 1 in. has been observed. This calls for proper design and accurate adjustments to insure adequate clearance between impellers and bowls. Corrosion from oxidation increases at high velocities, which explains why impellers are damaged more rapidly than bowls. Waters of 3.5 to 0 pH acidity call for materials such as 18-and-8 stainless steel. For lesser degrees of acidity, say 3.5 to 6, acid-resisting bronze is satisfactory. For a short range on each side of neutral (7 pH), for example a range of 6 to 8 pH, cast iron or bronze should be used, while above 8 pH iron is satisfactory. While salt solution is not particularly corrosive to iron or brass alone, because of electrolytic action it is quite corrosive to a pump built of the two metals in close proximity.

Many hints toward better maintenance of carbon brushes featured a paper on that subject presented by P. D. Manbeck, vice president, National Carbon Co., New York. Most changes which finally cause difficulty take place so gradually that careful inspection is required for their detection, he pointed out.

### Dirt a Basic Trouble

Dirt is the outstanding culprit. It causes brushes to stick in the holders thus overloading the free brushes and causing wear of the holders. The over-loading causes rapid brush wear, sparking, overheated shunts and sometimes anneals the springs. Thus the root of the trouble is usually not in the brushes visibly affected. Mr. Manbeck considers it better to err on the side of too much spring tension rather than too little. Greater spring tension is required for traction service than for stationary because of vibrations caused by track frogs and rail joints, etc.

Slotting is necessary with modern commutators since manufacturers are generally using the cheaper and harder micas and intend that the commutators be kept slotted. If a power slotting saw is used, it is important to stone the commutator afterward to remove the raised copper burrs along the edges of the bars. U-bottom slots do not develop feather-edge mica as soon as V-bottom slots. In slotting the V-bottom style, a small amount of copper should be cut from the bar edges to remove feather-edge mica.

Picking up of copper by brushes may be caused by feather-edge mica, in which case both positive and negative brushes pick it up, or it may be caused by electrolytic action, in which case only the brushes of one polarity are affected. These would be the positive brushes of a generator or the negative brushes of a motor. The cure for electrolytic-copper pick-up, he suggested, is to stagger the brushes to produce a negative area tracking and an equal positive area.

Commutator films which accumulate and serve as low-friction surfaces are composed of about 75 percent copper oxide and 25 percent carbon. Too heavy a film, which may increase contact drop to more than 3.2 volts, may cause arcing through the film. The cathode brush is the film former, and the speed of forming varies in direct proportion to the load. Brushes of the opposite polarity tend to scrape the film off mechanically, and thus a lightly loaded machine may not accumulate a film.

Brush-holder wear, usually by dirt, makes it impossible to seat the brush properly to the commutator, and thus may make it appear that the brushes are overloaded, Mr. Manbeck stated. One large traction company re-casts or renews its brush holders when wear exceeds 0.04 in. Aluminum brush holders wear rapidly because aluminum and carbon are far apart in the electrical series and thus promote electrolytic action.

Seating brushes by wear on the commutator promoted by use of a soft dusting stone is satisfactory, but the resulting dust should be cleaned thoroughly with air before the machine is put into regular service. Commutators should never be oiled. In some cases it is advisable to lubricate slightly with a wax candle to reduce friction until the load becomes greater and a film has time to form, he concluded.

 2080" OF HOLE IN COAL	 71 HOLES IN ROCK —1207" OF DRILLING	 50 HOLES IN COAL —2422" OF DRILLING	 209'1" OF HOLE IN ROCK
 46 HOLES IN COAL —2346" OF DRILLING	<b>KENNAMETAL</b> <b>ROTARY BITS</b> <b>REDUCE</b> <b>DRILLING COSTS</b> $\frac{1}{3}$ to $\frac{1}{2}$		 10,200" OF HOLE IN COAL
 71 HOLES IN ROCK —76'11" OF DRILLING			 71 HOLES IN ROCK —923" OF DRILLING
 5587" OF HOLE IN COAL	 209'11" OF HOLE IN ROCK	 275'5" OF HOLE IN ROCK	 1488" OF HOLE IN COAL

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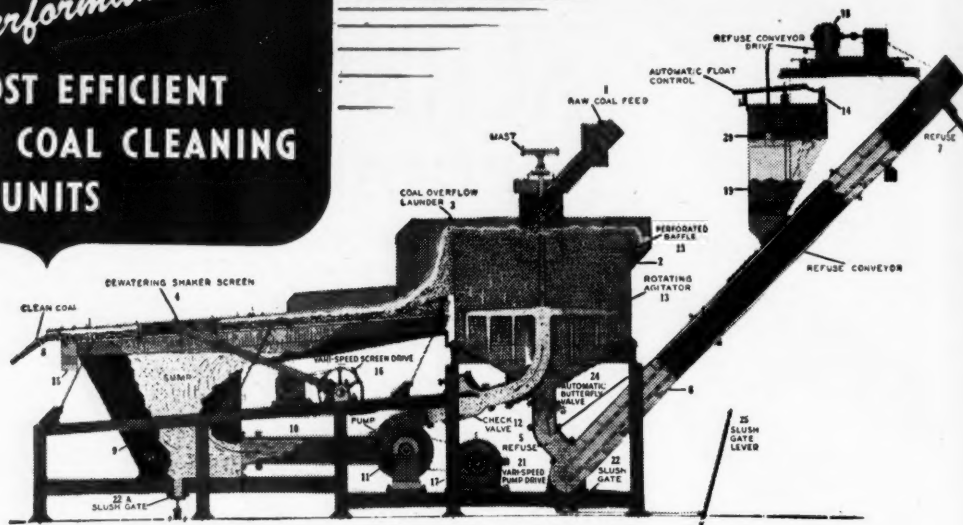
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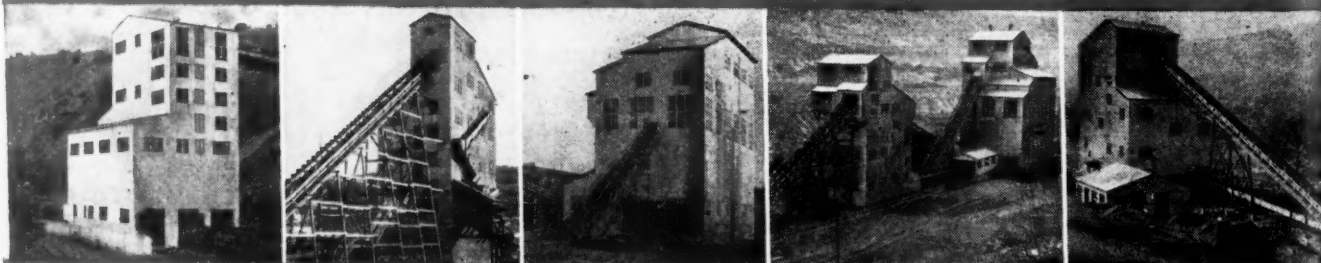
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## Stripping, British Mine Control Discussed by W. Va. Institute

Problems involved in strip mining coal in the mountains of West Virginia, the many factors on which the present nationalization of British mines is based, and difficulties of our own coal industry in Washington, were among the subjects presented and discussed at the mid-year meeting of the West Virginia Coal Mining Institute held in Huntington June 14.

In the absence of Joseph Pursglove, Jr., president of the Institute, R. H. Morris, vice president, Gauley Mountain Coal Co., presided at the morning and afternoon technical sessions. Jesse Sullivan, secretary of the West Virginia Coal Association, presided at the luncheon. At the dinner, Charles E. Lawall acted as toastmaster and introduced Robert J. Bowman, president, Chesapeake & Ohio Ry., who spoke on locomotive trends. An innovation and highlight of the meeting was a boat ride on the Ohio River for part of those attending the meeting.

The technical sessions were opened by A. C. Beeson, administrative assistant, West Virginia Department of Mines, who read a paper on regulation of strip mining. Strip production of the United States, he said, rose from 30,000,000 tons in 1938 to 101,000,000 tons in 1944 and furnished the difference between an adequate war supply and what would have been a disastrous shortage. In West Virginia strip mining, which started in the Pittsburgh seam in the northern counties, has spread until at present 14 beds in 20 counties are now being stripped.

In 1939 West Virginia passed the first bill to regulate strip mines, requiring posting bonds of \$300 for the first acre and \$150 for each additional acre to insure restoration of the surface. In 1945 the bill was amended to call for \$500 per acre, with a minimum of \$1,000. Other provisions in the bill require: (1) covering the face of the coal and burying high-sulphur coal; (2) sealing openings of abandoned underground works; (3) provision of erosion-free drainage so that ponds will not form; (4) removal of timber and other scrap materials; (5) regrading to restore contours; and (6) planting of trees. The inspection agency may modify these regulations.

Mr. Beeson reported that cooperation of the stripping operations has been good and no suits have been necessary. Regrading of rock areas is a question on which the public and the operators are divided, however. He reviewed the status of strip-mining laws of other states: Illinois' 1944 law and Pennsylvania's 1945 law are both in the courts. Indiana's law is extremely simple, and perhaps as a result of the tree plantings begun by the operators in 1930, there appears to be no public clamor for a change. The drafting of an Ohio law awaits the recommendations of a nine-man commission, which so far has been unable to agree. Maryland needs no specific law because its Bureau of Mines is empowered to make regulations which become law.

S. L. Gilpin, West Virginia University agricultural specialist, using slides, showed photographs of stripped areas, including those where efforts have been made at restoration and planting during the four years

of experimentation. Numerous difficulties have appeared, he said. Gently sloping areas regraded to original contour erode into gullies before vegetation can be started. In one place where the land owner has been persistent in obtaining restoration the cost has been perhaps 50 times the value of the land, and erosion into gullies has not yet been completely stopped.

Dr. Gilpin pointed out that forestry experts claim spoil banks should settle two years before trees are planted, and it appears that in this period nature will replant in favorable places. Because the narrow strippings in West Virginia are usually bounded by forests and quickly become replanted by nature, artificial planting is not being asked. Planting trees would cost \$60 to \$70 per acre. In the larger strip areas, however, the State is requiring the planting of low cover to help catch the seeds from natural trees.

As spoil banks lack nitrogen, they will not grow most of the grasses, he said, but if they are not contaminated with sulphuric acid, they will grow clover, which will build up soil suitable to grasses. After this natural build-up the land may be capable of growing better pasture than it did before stripping, which apparently results from the turning up of certain minerals that were depleted from the surface. Narrow strippings along crops on steep slopes should be graded nearly flat but pitching slightly toward the highwall, Dr. Gilpin said. Also drainage ditches should be provided at intervals at right angles to the wall through the grading. Terrace grading may be advisable on larger areas of gently sloping terrain.

### Combined Strip-and-Deep Mining

Experience to date in traversing 30 miles of crop line with strip operations and in a limited amount of combination deep-and-strip mining was given by C. R. Bourland, assistant to the vice president, New River Co., Mount Hope. (A description of the early work on these strippings appeared in *Coal Age*, February, 1945, p. 109.) The operation mines the Sewell seam of 48 in. average thickness, with steep hillsides. Since early in 1943 over 800,000 tons has been stripped, and the recovery has averaged 25,000 tons per mile of crop line. Approximately 8 cu.yd. of overburden is moved per ton of coal recovered. Most of the land stripped is near areas that have been worked out by underground mining.

To protect New River Co.'s reputation for high quality a company inspector was put into the pit, with authority to require the contractor to cast over the bank any and all coal of low quality, Mr. Bourland reported. All stripping is done by independent contractors at per-ton rates, delivered to the company's plant or into mine cars hauled by the company.

All contracts call for stripping to a nominal high wall of 40 ft., Mr. Bourland said, but it was found that a contract can't cover all situations and there must be cooperation between the two parties. For example, hollows where the overburden could not be dis-

posed of were by-passed. As vertical drilling proved to be too expensive, areas where sandstone prevented horizontal auger drilling, also were by-passed.

To be successful, contractors must be properly financed so as to afford suitable equipment this company found. One contractor, who had but one shovel for both stripping and loading and had to waste time tramming between those two operations, was forced to withdraw. Another, who was under-equipped also faded out. A third still on the job after three years, who has produced 250,000 tons for each of those years, has been well financed and has been handicapped only by having shovels with booms that are not as long as desired for maximum efficiency. This contractor has always managed to have ahead and waiting proved areas in case of trouble in other areas, and, likewise, he has always saved some proved areas near highways for winter work when trucking becomes difficult.

The New River Co. owns the land stripped, which is wooded and has little or no farming value. The crop-line stripping has some value as forest fire barriers and as a means of getting at fires to fight them. No leveling of the spoil or tree planting has been done.

### New Mine Described

Mr. Bourland described a new mine, with a 300-t.p.h. Baum-jig plant, which was opened in virgin coal with the plan of stripping first and then mining by underground methods the balance of the coal. After limited experience it now is doubted that recovery will be as high as it would have been by completing the underground mining first. The top has been difficult for the first hundred feet of entrance from the highwall, apparently because of the heavy shooting of overburden, and there also is apprehension that retreat close to the highwall will be difficult because the overburden is not confined.

A fourth contractor, who bought special stripping for this virgin development, loaded into new 10-ton mine cars. However, laying the 60-lb. track with No. 3 turnouts and erecting trolley wire and maintaining this in mud and cold weather proved very difficult and production was only 750 tons per day. It soon became evident that the stripping was outrunning the loading and that the exposed coal meant loss. The problem was solved and production jumped to 1,200 to 1,400 tons by adding spotting equipment and by developing and putting into use a portable hopper which holds two cars.

Underground work at this new mine has progressed only to the extent of seven pairs of entries driven 500 to 600 ft. How much better the first 100 ft. of top would have been without the effect of overburden shooting, Mr. Bourland stated he would not say. Maximum overburden is about 300 ft. It is planned to use belts underground and utilize the stripped areas as tramroads. Because the seam pitches 3 percent and to avoid trouble from the unconfined highwalls, the mine has been laid out with highways on the high side.

In conclusion, Mr. Bourland summarized the stripping experience of his company: (1) a flexible preparation plant is required for cleaning and washing; (2) sufficient

financing by the contractor is required; (3) the operator must be content with lower production in the winter; (4) stripping is a gamble; and (5) the New River Co. has recovered by stripping over 800,000 tons, 70 percent of which came from abandoned mines on which the company had placed no value.

In a discussion of the paper S. D. Brady, Jr., mining engineer, Baltimore & Ohio R.R., stated that the future of strip mining in West Virginia depends entirely on how high the wage scale goes. In the amount of labor required per ton lies the principal economic difference between producing coal from strippings or from underground workings.

### British Mining Traced

"Some of the Personnel and Political Aspects of British Mining" was the subject of a paper by G. R. Spindler, chief, West Virginia Department of Mines. He outlined the effects through 30 years of a series of Royal Commissions, each of which imposed something new, culminating in the recent complete nationalization of those mines.

The British Miner's welfare fund of 2c. per ton imposed in 1920 resulted in more money than could be spent so that it first was cut to 1c. and recently raised to 1c. The money was spent principally for bath-houses, pit-head canteens and community centers, but all those have not healed the men's feeling against the industry.

Production of British mines has dropped to less than 1 ton per manshift, Mr. Spindler stated. In part this can be attributed to the act of 1940, which resulted in the loss of control and discipline, a result he considers as inevitable when any agency is put in control. The lack of British technical progress, as compared to that in the United States, has been caused by the reluctance of private capital to invest in an industry plagued with regulations, and in part by national pride causing inertia against adopting ideas not originating at home.

Mining is a basic industry of the British Isles, and one of its many ills has been the tendency to base miners' wages on ability to pay. In 1938 227,000,000 tons was mined, of which 46,000,000 tons was exported. By 1944 production had dropped to 190,000,000 tons. In 1945 it was approximately the same and the prospects for 1946 are no better. In the recent nationalization mine owners were paid in government bonds which are not redeemable.

"Coal and Washington" was the topic of Cloyd M. Smith, editor of *Mechanization*, speaking at the luncheon. In Congress, which he said "is still the vital core of our government," he sees a hopeful trend toward legislation which will correct some labor difficulties. He posed the question as to whether Lewis envisions himself as a labor colossus seeking control of all labor in this country. He felt that it is strange that Lewis pushed the health and welfare fund at this time of good safety records when he might have done so years ago before the records were improved. The form of trusteeship of the fund actually amounts to his personal control of the fund, Mr. Smith stated. He believes that coal will be tighter next winter than during the war.

As the guest speaker of the dinner, Mr. Bowman spoke of the trends towards diesel

locomotives and cited an announcement by two eastern railroads during the past year of an intention to dieselize 100 percent. He feels, however, that the situation is not hopeless since over 90 percent of the railroad motive power is still steam, and he mentioned that the Chesapeake & Ohio does not own a single diesel locomotive. Ten percent of the coal output of the United States originates on the Chesapeake & Ohio.

An unusual feature of the convention was inaugurated when fifty men, representing the boat's full capacity, left Huntington at 4 p.m. on the American Rolling Mill Co.'s large towboat, the Charles R. Hook, for a 12-mile trip up the Ohio to Cypress Manor, the home of F. P. Slack, general agent of the Inter-Ocean Casualty Co., where light refreshments were served. The boat returned in time for the delegation to attend the dinner that evening. Many other members were conveyed to the Slack home by automobile.

Several members who were on the boat trip recalled having attended boat meetings of the Illinois Institute and talked of starting a move to make a two-day boat trip on the Ohio a regular event for annual meetings of the West Virginia Institute.

### Deer Explores Coal-Mine Tipple

Deer are by no means rare in Logan County, W. Va., but when a large one seeks the roof of a high tipple for a frolic it is something to remember. Through the courtesy of John E. Lea of the West Virginia Coal & Coke Corp., Omar, we reproduce this photograph of a deer on the company's Rossmore tipple.

Apparently the deer came down the mountainside to the main portal at railroad level and stepped onto the roof covering a trestle by which mine cars are hoisted to the tipple dump. Climbing that roof, the animal continued until it reached the very top of the main tipple. Shortly after the photograph was made, it fell through a skylight. From the tipple floor the deer jumped down into a partially loaded car of slack, and then, apparently not seriously injured, it leaped out of the car and raced back up the mountain.



Curious deer surveys the countryside from the roof of the Rossmore tipple, West Virginia Coal & Coke Corp., Omar, W. Va.

### Deadline Set For Pipeline Bids

A deadline of July 30 for acceptance of bids for both the Little Inch and Big Inch pipelines has been announced by the War Assets Administration. Bids submitted to date have not been satisfactory in their original form, the WAA has stated and has called for prompt submission of other bids.

The policy set up for disposal of the lines gives preference to their use for the transportation of petroleum and also maintains that the lines must be so handled to insure "their ready availability for Gulf-to-East Coast petroleum service."

Construction of a new 1,200-mile natural-gas pipeline to extend from the Texas Panhandle area to Los Angeles has been authorized by the Federal Power Commission. Cost of the line is expected to run \$70,000,000, and it is to begin operation in June 1947. Total daily capacity will be 305,000,000 cu.ft.

### Hanna Sale; Other Operator Developments

Transfer of all the coal-mining properties of the Hanna Coal Co. in Ohio to the Pittsburgh Consolidation Coal Co. was announced June 7 by the M. A. Hanna Co.

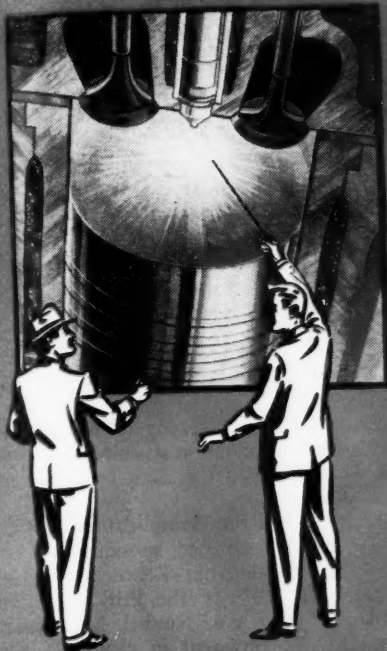
The consideration for the transfer of the properties was the issuance of 325,000 shares of stock by the Pittsburgh Consolidation Coal Co., which is to be held by Hanna for investment. Production from the Hanna properties totaled about 6,000,000 tons in 1945, including deep and strip mines, and with this additional tonnage Pittsburgh Consolidation—already the world's largest commercial producer—will reportedly have a total capacity of 33,000,000 tons yearly.

Operation of the properties will continue in the name of the Hanna Coal Co. without change in personnel, according to the announcement.

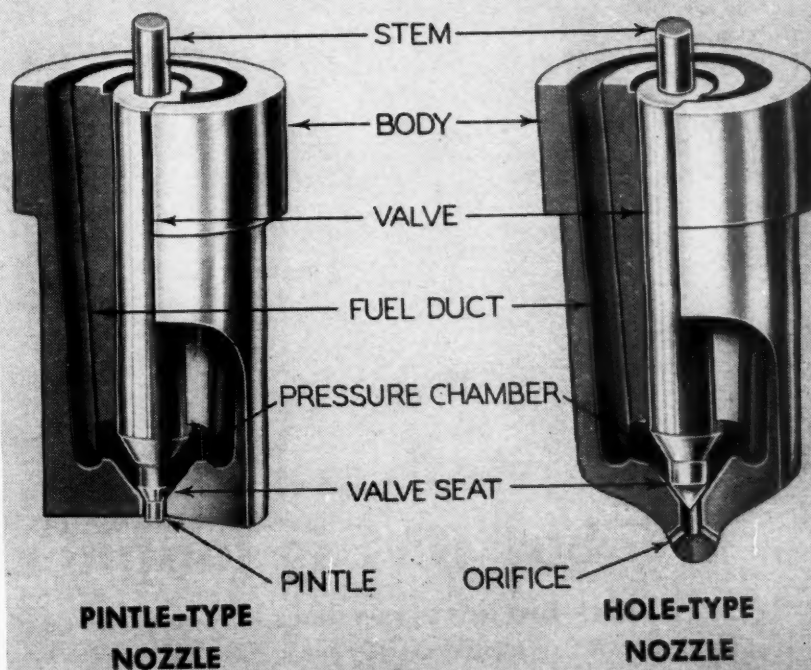
According to reports, the Consolidation Coal Co., Fairmont, W. Va., is to build a coal preparation plant at Maidsville, W. Va., and another at Nora, W. Va., at a total cost of \$1,000,000. The Truax-Traer Coal

# GOOD FUEL INJECTION

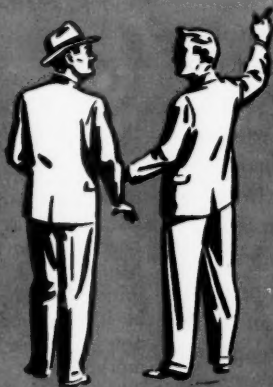
## *Requires a Tailored Spray*



THE MAIN FUNCTION of an injection system is to deliver fuel to the engine cylinders in such a manner that it will burn efficiently. That's why the injection nozzle is so important. It must produce a spray that meets exactly the combustion-chamber requirements.



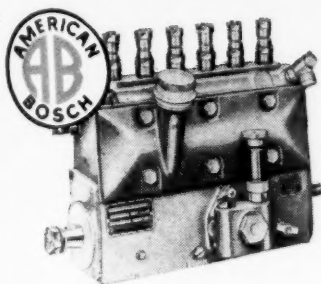
Tailoring is the art of producing the precise spray characteristic which the engine likes best. Tailoring know-how comes from long experience in correlating the selection of every part of the injection system for the single purpose of providing the engine with the ideal spray pattern.



THE CORRECT PATTERN PAYS ITS WAY. American Bosch Injection Equipment provides tailored fuel sprays to fit your Diesel's combustion chamber. That means fuel economy, power to suit the task at hand, and satisfactory performance under all operating conditions.



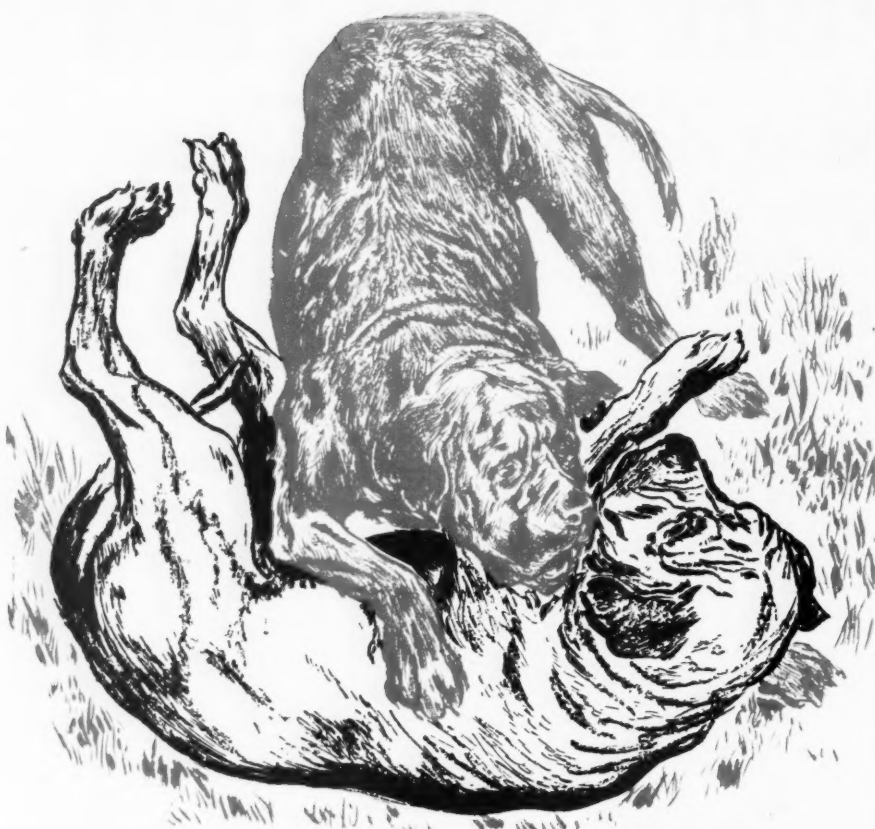
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AMERICAN BOSCH CORPORATION, SPRINGFIELD 7, MASS.

# AMERICAN BOSCH

## *Diesel Fuel Injection*



## Both are tough... but ONE is tougher!

**WHEN TWO MASTIFFS TANGLE** in a snarling pinwheel... the result is never a draw. The dog with the extra staying power always wins the day.

**EXTRA STAYING POWER**, in wire rope as well as dogs, always pays off when the going gets rough. The extra stamina of Rochester wire rope shows up strong in the grind of daily operation... gives maximum protection against wear and tear.

**ROCHESTER WIRE ROPES** owe their extra stamina to the "four M's" that enter into their fabrication—MEN who are skilled craftsmen... working with MATERIALS of certified high strength and utility... using METHODS and MACHINERY that are strictly modern and exactly right for the precise and demanding work they were designed to do. All types, sizes, grades and constructions—preformed or standard—are available for prompt shipment. Rochester Ropes' engineers can advise you on your special problems of wire rope selection, use and maintenance. Inquiries invited.



**LOCKED-IN LUBRICATION** is forced by air pressure between individual wires. This process requires twice as much lubricant as is absorbed by other methods... protects against internal friction caused by rope passing over sheaves... assures longer life and better service from wire ropes made by Rochester.

# ROCHESTER Ropes

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## MEETINGS

- **Southern Appalachian Industrial Exhibit:** sponsored by the Pocohontas Electrical and Mechanical Institute, Aug. 22, 23 and 24, Bluefield, W. Va.

- **American Institute of Mining and Metallurgical Engineers:** 75th anniversary meeting, postponed from Sept. 16-18, 1946 until the week of March 17, 1947.

- **Joint Fuel Conference of the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers:** Oct. 24-25, Bellevue Stratford Hotel, Philadelphia.

- **Mining Society of Nova Scotia:** annual meeting July 4 and 5, Cornwallis Inn, Kentville, N. S. Canada.

Co. is reportedly planning to build tipples and install equipment at its mines at Ceredo and Dorothy, W. Va., at a cost of nearly \$600,000.

Formation of the Consolidation Coal Co. (Ky.), a wholly owned subsidiary to take over its operations in Kentucky, was announced June 27 by the Pittsburgh Consolidation Coal Co. Samuel M. Cassidy, formerly vice president in charge of Kentucky operations, has been named president of the new company, with headquarters at Jenkins.

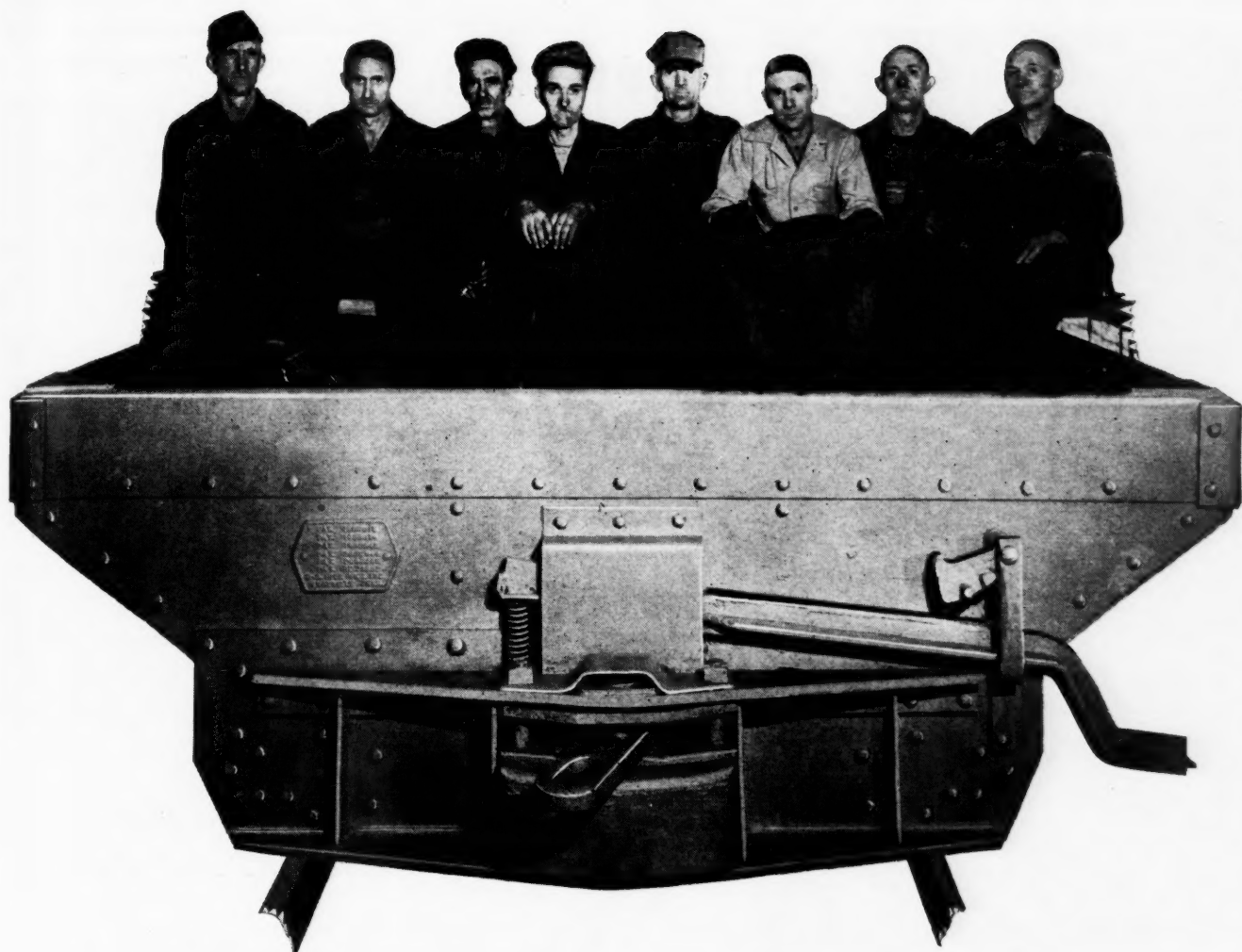
Other newly elected officers of the company include: George O. Tarleton, vice president, operations; Madison A. Dunlay, assistant to the president; A. Roy Martin manager of properties; Elmer J. Berlin, treasurer; Frank H. Price, assistant secretary; and R. J. Howard, chief engineer. Creation of the new company is in line with Pittsburgh Consolidation's policy of decentralizing the management of its mining properties in the different states, and the officers of the new firm will be in complete charge of the operations, it was announced.

Actual start of what may become one of the largest mines in Illinois was announced last month as construction of an air shaft began at the new Bell & Zoller mine near Murdock, Ill. Some coal is expected to be mined by late fall but the mine will not be in full production until next year. Plans now call for installation of a 2,100-ft. mother conveyor belt. Norman Prudent is mine superintendent, and Kenneth Neibich is master mechanic, of the new operation.

The Caney Creek Mining Co., with headquarters in Madisonville, Ky., has been formed, with a capital of \$200,000, to operate an underground mine in Muhlenberg County. J. A. Kimbrough is president of the firm and H. R. Rutstein and J. W. Wright are vice presidents.

A 446-acre tract in Milton township near Berlin, Ohio, has recently been acquired by Earnest Downard of Jackson, and according to reports, he is to begin strip-mine operations just as soon as the necessary equipment can be secured.

Stripping of the former Consolidated



## ★ CAPACITY IS NO PROBLEM FOR S-D 1-2-3 "AUTOMATICS"

If you want 1½ ton or 25 ton capacity mine cars—it makes no difference about size—you can have them, along with increased production with fewer cars . . . decreased production costs . . . exclusive, automatic S-D "Jerk-Out" unlatching device, and other advantages to be found only in S-D 1-2-3 "Automatics".

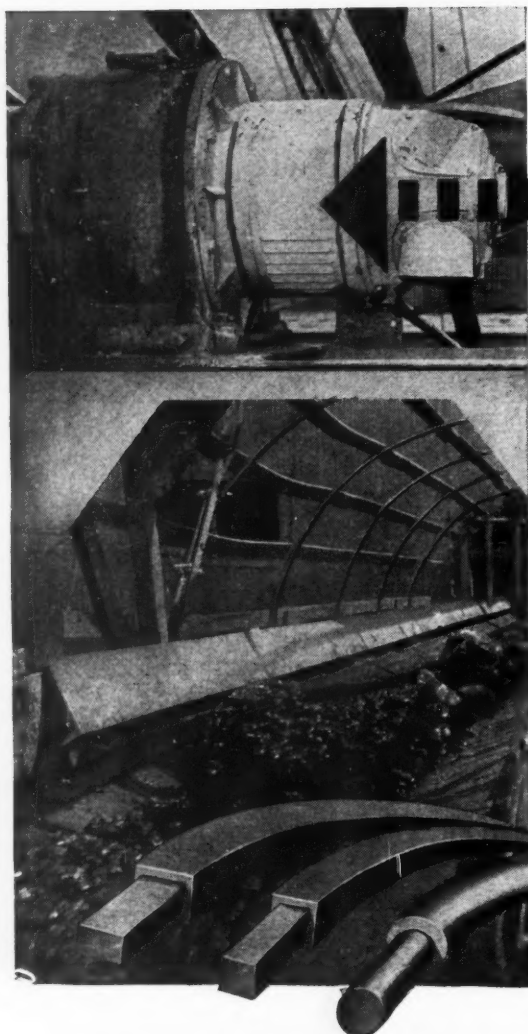
To assure you the increased tonnage with fewer cars . . . the great decreases in operating costs . . . the savings in manpower and other costs reducing claims we make for S-D 1-2-3 "Automatics", the cars are tailored to fit your pattern. It's the engineering work, covering every detail, on each individual installation, as well as the famous 1-2-3 automatic principle of discharging coal that has made these remarkable cars so amazingly successful.

The 1-2-3 automatic principle of discharging is invariably the same, regardless of size or capacity of car . . . and it's equally effective on all cars regardless of capacity.

Coal mines everywhere are recognizing, more and more, that S-D 1-2-3 "Automatics" are essential engineered haulage equipment for modern mining. Mines with obsolete types of cars are changing over more rapidly than many operators realize. If you are thinking about new cars, you should do something about it now.



*Sanford-Day Iron Works, Knoxville 9, Tennessee*



If you have  
to rewind it  
..make it a

*heat-  
beater*

## ***Deltabeston*<sup>\*</sup> magnet wire makes overworked motors last longer**

So often, the *key* motors in your mine or preparation plant are *overworked* motors. When one must be rewound, protect yourself against future burnouts that interrupt production. Rewind it — or specify that it be rewound — with DELTABESTON magnet wire — the outstanding Class B asbestos-insulated magnet wire.

Deltabeston magnet wire is made in shapes and sizes interchangeable with double-cotton insulated wire. Its pure felted asbestos, impregnated with a heat-beating bonding agent, makes light of temperatures up to 200 C. For the full story, write Section Y1-710, Appliance and Merchandise Department, General Electric Company, Bridgeport, Connecticut. All Deltabeston asbestos, glass and synthetic wires are distributed nationally by G-E Merchandise Distributors.

\*Trade-mark Reg. U.S. Pat. Off.

**GENERAL  ELECTRIC**

### **EQUIPMENT APPROVALS**

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in May, as follows:

**Goodman Mfg. Co.—Type 93DOAC locomotive, storage-battery type; Approval 1539; May 24.**

**Joy Mfg. Co.—Type 5SC-5PD shuttle car, battery operated; three motors, 90 volts, d.c.; Approval 556; May 27.**

Coal Co. Jackson County properties, near Murphysboro, Ill., recently acquired by Stewart Jenkins, is expected to start by fall. All but two holes of the opening exploration had been completed, according to reports, and a 7-ft. vein of coal has been drilled at several points. A power shovel and dragline have been ordered.

Opening of a strip mine near Madisonville, Ky. by the Pittsburg & Midway Coal Co. has been reported. A tippie, office and other buildings are to be constructed at an immediate cost of \$40,000.

The River Ridge Collieries, Inc., Kitts, Harlan County, Ky., has been formed by J. G., W. W. and Shirley H. Whitfield, with a capital of \$200,000.

### **County Commission Regulates Coal Mining**

An ordinance providing for regulation of both strip and deep mining was passed by the Daviess County, Indiana, board of county commissioners last month. By means of a master zoning plan the ordinance provides areas where shaft and strip mining may be carried on and restricts such operations to two full townships. A permit from the county planning commission must be secured before any mine may be opened.

Strip mines are required to replace all soil, subsoil and other strata removed during their operation and must post a bond of \$150 an acre to assure compliance. The escape of refuse into streams or on to other property is also made unlawful under the regulation.

### **French Coal Mines Seek U. S. Equipment**

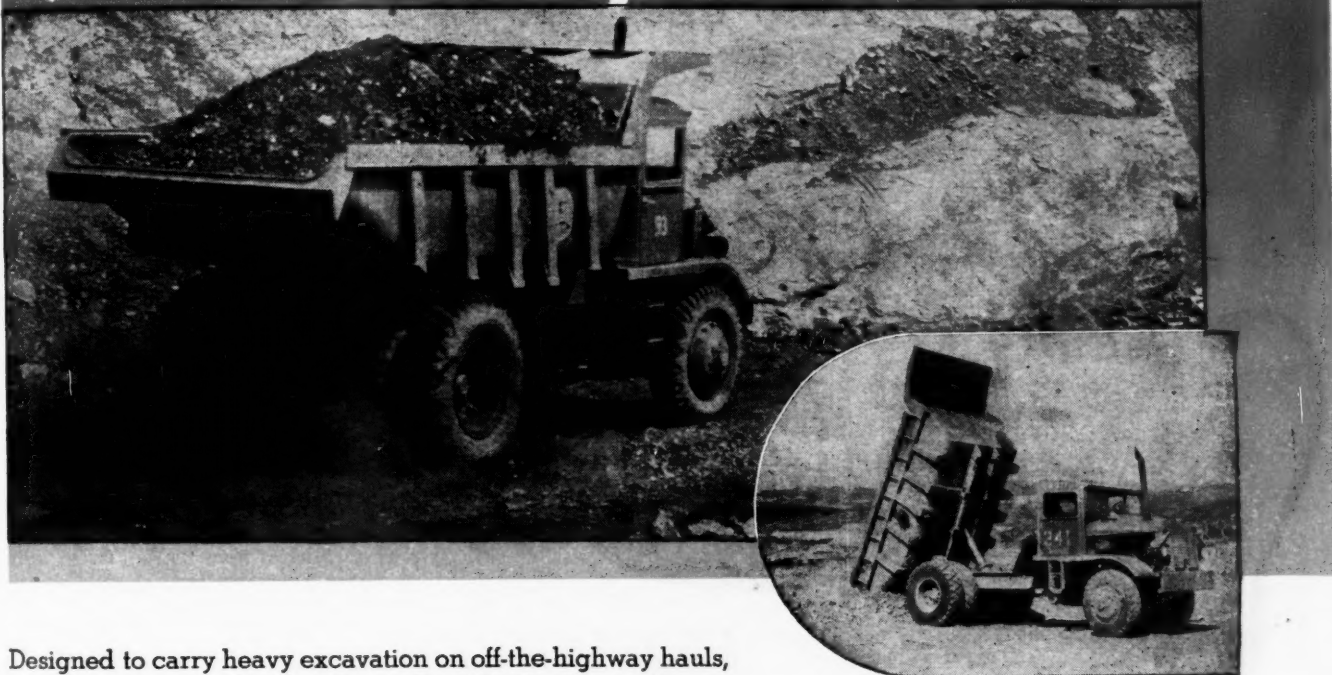
The French coal-mining industry plans tentatively to spend \$40,000,000 on new U. S. coal-mining equipment over the next four years, with orders to be placed as soon as possible, officials have stated to McGraw-Hill World News. The same officials declare that France will stop her temporary policy of importing U. S. coal at the end of 1946, after spending \$48,000,000 for whatever American coal they could get plus the high shipping charges to transport it.

French plans for importing coal-mine equipment—scheduled to total \$60,000,000 from all countries under the five-year over-all reconstruction plan drawn up by Jean Monnet as head of the Commissariat du Plan de Modernization et d'Equipe-ment—have been given the green light by approval

# Versatile Hauling Unit

**FOR MINES AND QUARRIES**

## Rear-Dump EUCLID



Designed to carry heavy excavation on off-the-highway hauls, the sturdy body of the Rear-Dump Euclid is built to withstand the pounding and wear of loading by large shovels and drag-lines and the impacts of hauling large loads over rough roads.

Because of its body design and method of dumping, this Euclid will handle all types of material, overburden, rock, coal, ore, etc. It has a wide range of usefulness for heavy construction, mining and quarry work.

Powered by 150 h.p. or 200 h.p. Diesel engine, the Model F Euclid has a capacity of 30,000 lbs. and 9.7 cu. yds. struck measure. Travel speeds with full load are from 2.1 m.p.h. to 22.8 m.p.h. The full-floating, double reduction planetary type Euclid drive axle is unequalled for continuous performance and long life in off-the-highway service.

Ask your Euclid distributor or write direct for informative literature which shows Euclids at work in mines and quarries.

**The EUCLID ROAD MACHINERY Co.**  
CLEVELAND 17, OHIO

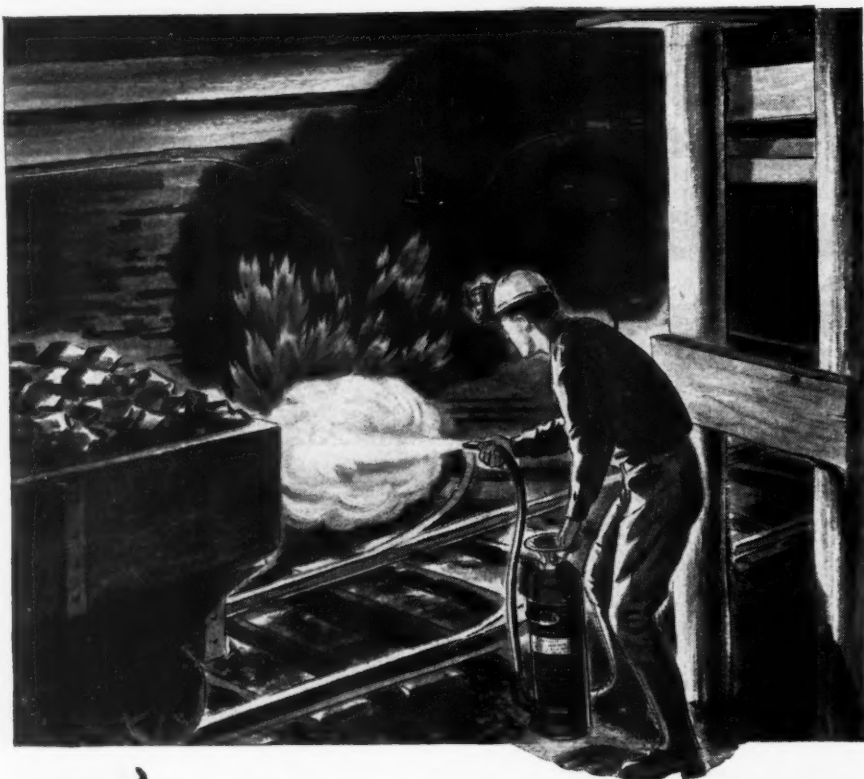
High dumping angle of chute type body and clearance from rear wheels dumps the load over the bank.



**EUCLID FRAME  
WITHSTANDS SHOCKS**

The sturdy rigid frame of this Euclid is a foundation of permanent strength. Side members are wide-flange, deep-section "I" beams joined by two large tubular torque members at the rear and a heavy box section front cross member. Rubber cushions support the body and cushion the impacts of loading and traveling over rough haul roads. Pivot shaft bushings are rubber mounted, thus relieving the frame and shaft from stresses during dumping.





Dugas 15-T  
Hand  
Extinguisher

## STOP FIRE FASTER WITH



## DRY CHEMICAL

● Upon striking fire, DUGAS Dry Chemical instantaneously releases 1,100 times its volume in flame-smothering gas that chokes off fire in seconds. The swift, fire-stopping power of DUGAS Dry Chemical is unaffected by wind or draft. It is undiluted by passage through the air. The gas is released only in the immediate flame area.

Dangerously close approach to flames is eliminated because the stream of dry chemical is expelled under high pressure, permitting safer and longer range fire extinguishing operation.

Amazingly fast and effective DUGAS Extinguishers provide more fire protection... per pound... per unit... per dollar... against all types of oil, gasoline, grease, paint, and electrical equipment fires. And DUGAS Extinguishers Can be Recharged on the Spot.

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Write today for further information including authoritative, impartial data showing characteristics of all types of approved fire extinguishers. The Ansul technical staff of fire protection engineers is ready to serve you.

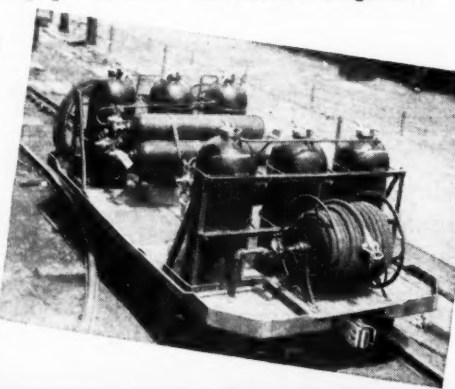
SEND FOR BULLETIN No. 821

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- Maintenance and Repair Shops above and below ground.
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Actual photograph of an ANSUL DUGAS Mine Fire-Fighting Car at a Mine in Pennsylvania.



# ANSUL CHEMICAL COMPANY

FIRE EXTINGUISHER DIVISION, MARINETTE, WISCONSIN

of \$1.4 billion of U. S. credits to France. Fuel is regarded as the most urgent need for further French recovery, and officials feel that only by greater mine mechanization can their reconstruction and expansion goals for the French economy be met. Consequently new mine equipment is placed high on the import priority list.

Because the northern French mines have been nationalized (and the southern mines soon may be), all buying of mining equipment will be done by the government. Although a special buying mission may be sent over for the purpose, French government purchases in the United States are normally handled by the French Supply Council, with offices in New York and Washington.

Certain U. S. government formalities may delay temporarily placing of some orders. Any buying with funds of the \$650,000,000 Export-Import Bank loan awaits final approval by the Bank of detailed purchase lists. Also, since some of the required equipment may be in short supply in this country, C.P.A. allocations may be necessary.

French production goals under the Monnet plan call for boosting coal output from the 50,000,000 metric ton annual level reached this spring to a level of 65,000,000 tons in 1950. Productivity per man-shift is low today, as compared with 1938, and France is expected to continue short of manpower. Consequently greater mechanization is largely relied on to meet the goal.

To supplement domestic output, France has been insistently asking for a guarantee of 20,000,000 metric tons of coal imports annually from Germany for the next twenty years, to be included in the peace treaty. More coal imports from Great Britain have also been sought. With these two normal sources the French hope to permanently relieve themselves from the unusual necessity of buying American coal.

### Other Overseas Coal Notes

OSLO, Norway (McGraw-Hill World News)—Resumption of coal shipments from Spitzbergen on a large scale is expected in the near future as workmen speed repairs on the mines and installations blasted by the Germans in September, 1943. Fires which have been raging in the shafts are being brought under control and several have been extinguished.

BRUSSELS, Belgium (McGraw-Hill World News)—Following the Belgian Premier's recent call for modernization of Belgium's coal mines (Coal Age, May, 1946, p. 166), the Administration of Mines is making inquiries about new American equipment. Over the next decade operators are expected to invest several million dollars in new equipment, according to Lucien Boulet of the Mines Administration. American machines however would have to be workable in the Belgian seams, which average 2 ft. in thickness, ranging from 12 in. to 5 ft. American equipment firms interested in possible Belgian business should send catalogues to M. Boulet, 70 Rue de la Loi, Brussels.

PRAGUE, Czechoslovakia (McGraw-Hill World News)—The Stalin Works at Most now are producing a large number of coal distillation byproducts from poor quality coal obtained by surface mining.

Dr. Jaroslav Tichy, head of the Stalin

Works and deputy general director of the nationalized Czech chemical industry, said it is hoped that Prague will be supplied with coal gas from the Most works this winter by means of a 45-mile pipeline. The Stalin Works eventually is to utilize the entire output of the North Bohemian coalfield.

Moscow (McGraw-Hill World News)—Automatic block systems and centralized switch controls are being installed in two large coal mines in Eastern Russia as part of a program of advanced mechanization now being carried out. The system will be based on that of the Moscow subway.

Some 1,500 electric traction motors will be in operation this year in the mines of this area and 28 major collieries are going over to the use of 1-ton cars, which involves relaying of the track. More than 30,000 wagons are to be in use by the end of the year.

CAPETOWN, South Africa (McGraw-Hill World News)—The South African government has appointed a commission of inquiry to investigate the country's coal resources, which were last estimated at 225 billion tons. Reason for the appointment is a projected large expansion in local steel-making capacity, coupled with estimated known coking-coal reserves of only 37 years.

The steel expansion, to be undertaken by the South African Iron and Steel Industrial Corporation, also calls for new coal-washing equipment.

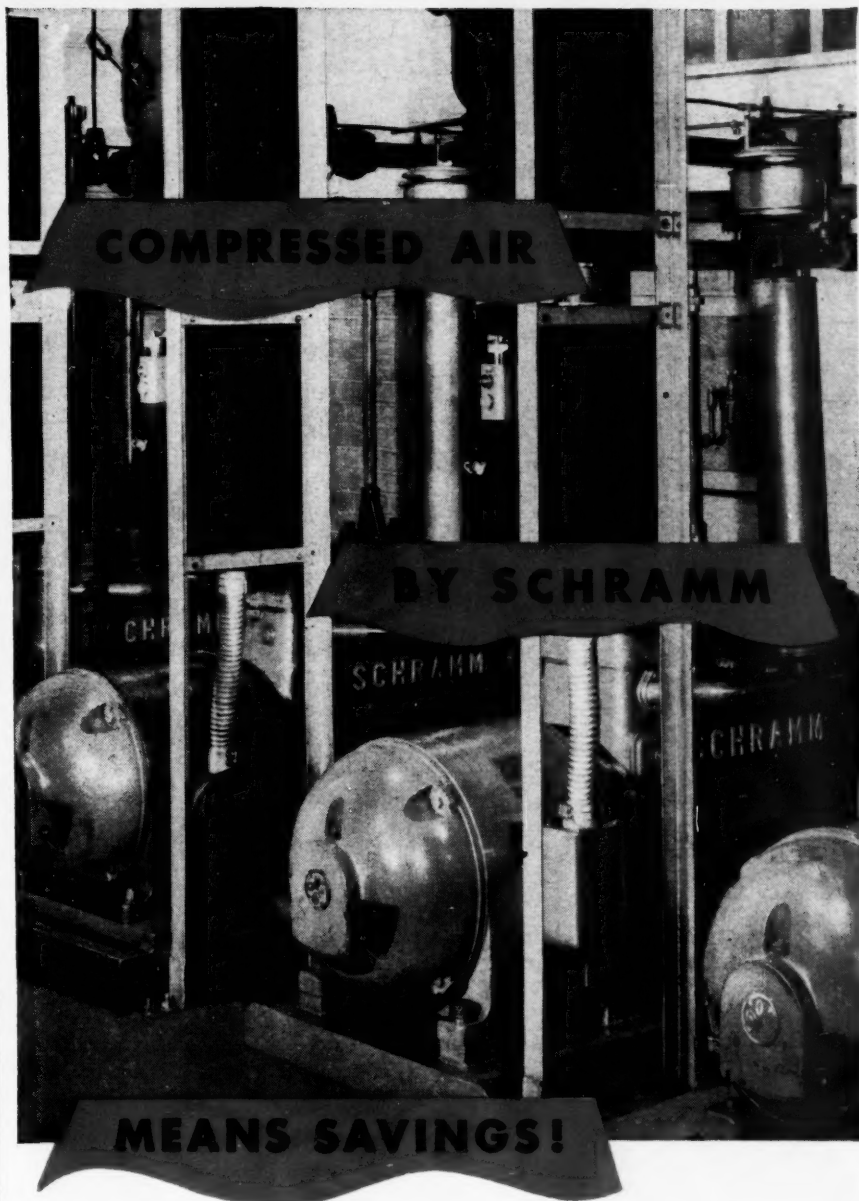
Acceptance of the five-day week for the British miner was announced in Parliament June 26 by Emanuel Shinwell, Minister of Fuel and Power. The urgent need for new workers was cited as the basis of the decision. The miners' union has long advocated the move, insisting that new miners would not be forthcoming until it was put in effect.

## Canadian Shortage Spurs Coal Mining

Considerable emphasis was being placed last month by government officials on developing Canadian coal resources, with less dependence upon imports from the United States, as the results of the U. S. coal strike and Canadian shipping strike made it evident that the current coal shortage might be expected to continue throughout the winter. Canada's supply of coal is 5,500,000 tons under normal for this time of year, C. D. Howe, Minister of Reconstruction, in June told Parliament, declaring that he did not see how the shortage could possibly be made up by next winter.

A record shipment of 1,000,000 tons of western Canadian coal into the Ontario-Quebec market this year is planned by the federal government in a desperate effort to help alleviate the fuel shortage that is as certain as winter, E. J. Brunning, Coal Controller, announced on June 13. Last year such coal shipments, stimulated by federal government help in several fields, reached 500,000 tons—many times what it was in peace years.

The government was also reported taking steps to increase fuel-oil supplies and an



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From it you will see the wide range of sizes  
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**WEST CHESTER**  
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# Penny Wise, Pound Foolish?

Using a water pump instead of  
a dredge pump for circulating  
water in coal washery systems?

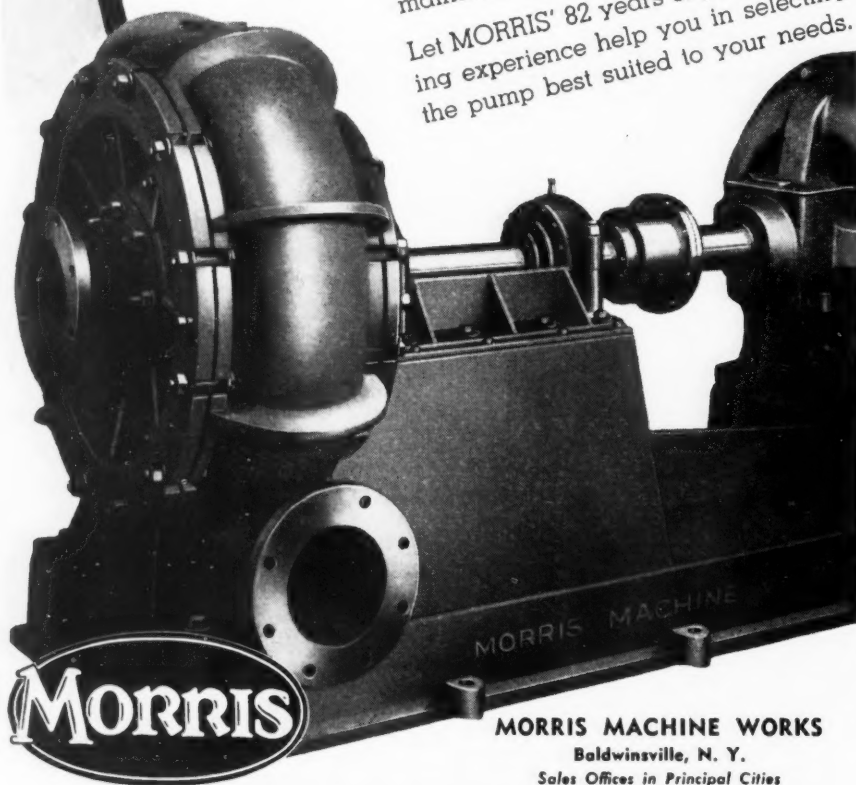
**DON'T DO IT!**

**T**HERE are solids in all washery circulating water, in some systems 4 or 5 per cent; in others, as high as 25 per cent.

But whatever the percentage, the abrasive action of these fine particles of coal and sand rapidly cut and score conventional water pump sealing rings and other closely running parts to such an extent it is necessary to replace them in some cases as frequently as every six weeks—an expensive task when measured in labor, cost of parts and plant shut-down time.

Compared to a dredge pump that will maintain peak operating efficiency for months, it is false economy to use a water pump for circulating water in coal washing systems in the mistaken belief that savings in power outweigh maintenance and replacement costs.

Let MORRIS' 82 years of pump-building experience help you in selecting the pump best suited to your needs.



**CENTRIFUGAL PUMPS**

**MORRIS MACHINE WORKS**  
Baldwinsville, N. Y.  
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attempt was being made to stimulate manufacture and use of oil burners, with the hope that oil burners would provide heat equivalent to 600,000 tons of coal this year.

In Alberta, plans continued to open new shafts to tap the Highwood area deposits, said to contain 6,400,000,000 tons and described as one of the largest undeveloped hard coal deposits in the world. B. S. Parkinson, president of Ford Highwood Collieries, Ltd., the company that has leased and is developing over 11,000 acres of this deposit, has announced that the company will be on a production basis in time to assist in alleviating the expected extreme coal shortage in Canada this coming winter.

Plans have been completed for the construction of a 40-mile railway line from the mine to tie up with both the Canadian Pacific R.R. and the Canadian National R.R. at Okotoks, Alberta.

The important fact, states Mr. Parkinson, is that the Alberta coal product can be readily competing, from an efficiency standpoint, ton for ton, with any type of coal presently imported into Canada. This places a ready-made market for millions of tons of coal per year without encroaching in any way on present Canadian production. Coal-mining engineers who have examined the possibilities, estimate the tonnage of coal on the properties being developed by the Ford Highwood Collieries, at one and one-half billion to two billion tons. Of this huge tonnage, some 600,000,000 tons lies above drainage, which insures production of 5,000,000 tons per annum for approximately 100 years at minimum cost, Mr. Parkinson stated.

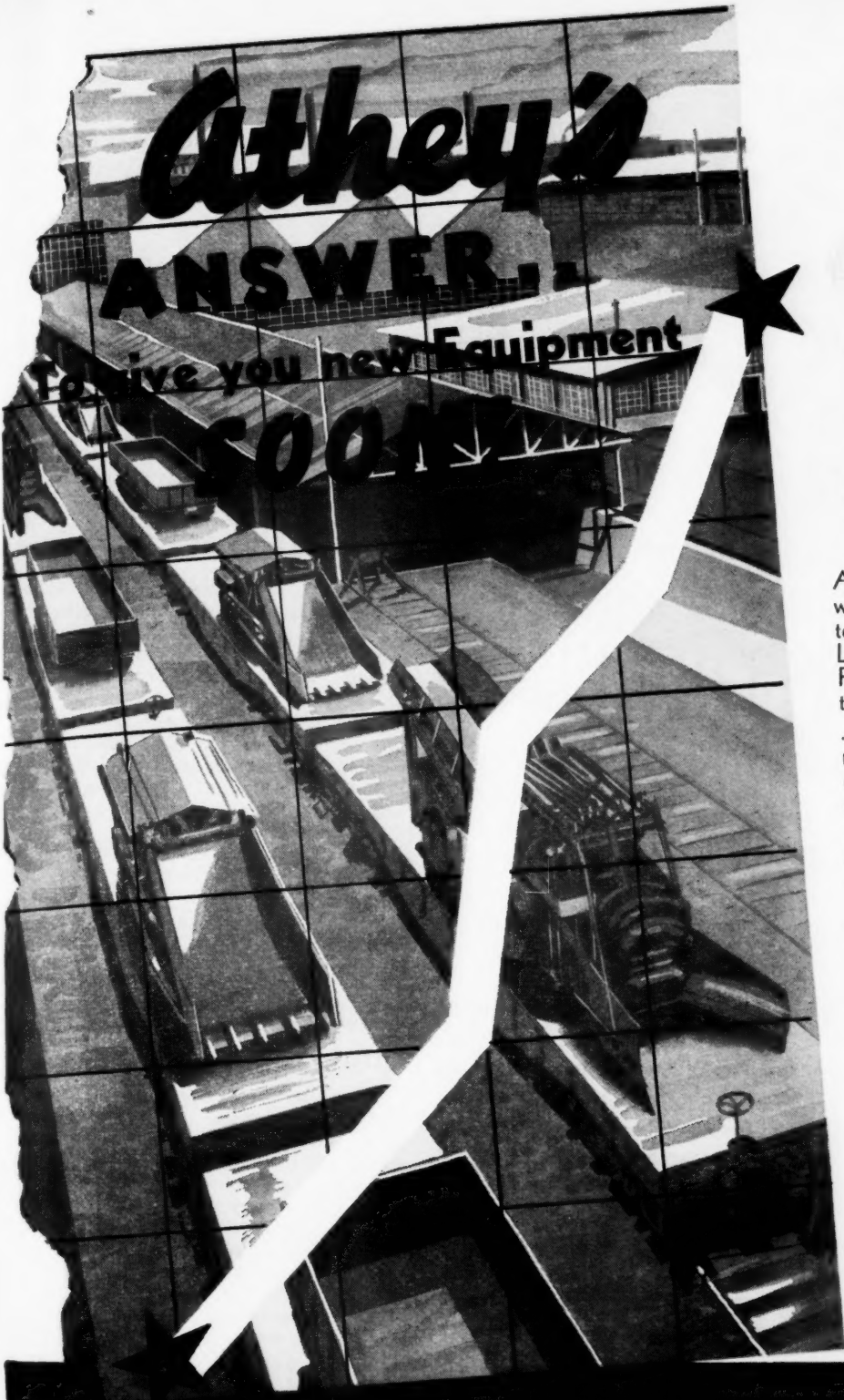
The first steps toward development of a vast new coal field with an area of 40 square miles and potential production of 100,000,000 tons of coking coal present has been taken with the request to the Canadian government to consider extension of the Pacific Great Eastern R. R. north of Hudson Hope to the new field, then eastward to Hines Creek, Alberta, where it would connect with the Northern Alberta R.R., giving the Peace River country outlets both east and south.

The new field, 40 miles north of Hudson Hope, was discovered in 1942 but was kept secret until the original finders were assured of protection. The seam is 7 ft. wide and the coal analyzes 14,225 B.t.u.

Opening of a new mine on the McBean seam at Thorburn, Nova Scotia, by the Acadia Coal Co. was said by the Nova Scotia Regional Reconstruction Council to insure continuance of operations in that area for 25 years with employment for the 1,300 men now working at the nearby Stellarton pits. Development work has been started on the new mine and production is expected to begin by the end of the year.

Experimental work at the Onakawana lignite beds, 125 miles north of Cochrane, Ont., is being discontinued because recent studies have indicated that this fuel cannot be used on a commercial basis at this time, according to an announcement by H. C. Rickaby, Ontario Deputy Minister of Mines.

While expressing the doubt that the idea was economically feasible in that province, L. D. Currie, Nova Scotia Minister of Mines, recently told the legislature that his department had been carrying on research on the possibility of burning whole seams of coal underground to develop power and by-



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**ANSWER...**  
**To give you new Equipment**  
**SOON!**

**INCREASE IN  
PRODUCTION OF  
Athey  
PRODUCTS...**

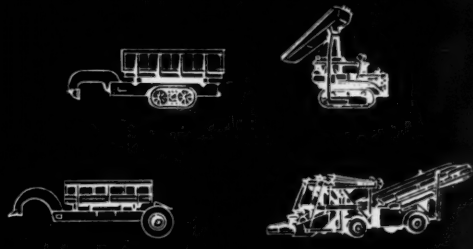

Athey wants everyone to know what is being done at the factory to speed delivery of new Mobil-Loaders, Force-Feed Loaders, and Forged-Trak Trailers. Here are the facts...

- ... quarter of a million dollars recently invested in new machinery for faster output at highest quality.
- ... expansion and revision of assembly lines for greater efficiency and increased production.
- ... all departments operating at full capacity, manned by highest skilled workmen.
- ... a production rate today substantially greater than that of prewar level.

That's "Athey's Answer" ... and the reason you will receive your urgently-needed machines sooner than you expected!

**ATHEY PRODUCTS CORPORATION**  
Chicago 38, Illinois





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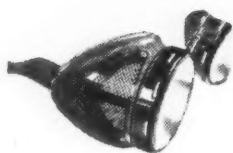


STYLE RR50



**NOT  
THEY ARE EXPENDABLE**

### PROTECT EYES WITH WILLSON CUP GOGGLES



Two way ventilation inside lens through sidescreen and slotted ring keeps fogging to minimum.

The tougher the job, the more your men will appreciate the dependable protection of WILLSON RR50 cup goggles.

Heat treated Super-Tough\* lenses in durable plastic eye cups, provide both front and side protection against steel chips, splashes of molten metal and similar hazards encountered in chipping, riveting, casting and such occupations. A specially designed resilient spacer ring under the lens provides a greater factor of safety when the lens is subjected to severe impact.

For utmost comfort in a goggle of this type, the eye cups are molded to fit the eye cavities. The nose bridge can be adjusted for correct spacing between the eye cups and does not ride the nose, while snug fit without pressure is assured by an adjustable headband. Dual ventilation gives through draft by means of a perforated sideshield, and over the lens surface through a slotted retaining ring.

\*T.M. Reg. U. S. Pat. Off.

For help on eye protection problems get in touch with your Willson distributor or write direct to Willson Products, Inc., 239 Washington St., Reading, Pa.



**WILLSON**  
DOUBLE  
**PRODUCTS INCORPORATED**  
READING, PA., U.S.A. Established 1870

products. The data were being collected, he said, with the thought of salvaging coal that it was inexpedient to get by mining. Studies to date did not reveal the plan as otherwise economical in that province, and a large body of virgin coal, which Nova Scotia does not have, is necessary, he stated.

### Mine Superintendent Resigns in Protest

L. R. Chapman, general superintendent, Pond River Collieries, Madisonville, Ky., announced June 17 that he and his brother, Louis Chapman, superintendent, had resigned in protest against the refusal of a United Mine Workers local to accept 25 World War II veterans as members.

He said the veterans had sought U.M.W. membership in order to remain employed at the concern's strip mine, "but the union wouldn't take them."

The veterans had been hired last month, Chapman said, to replace most of the 35 U.M.W. miners who failed to report for work there after the government took the nation's soft-coal mines in the U.M.W. strike.

After the strike's settlement, it was necessary to dismiss the veterans, Chapman said, because "the government told us we had to operate a union mine because we had a union contract."

Chapman said he intended to find jobs for as many of the veterans as he could in his construction business. He also announced his resignation as general superintendent of Pan May Coal Co., which operates a strip mine.

### High Operating Costs Shut Down Colliery

The Parker No. 2 colliery of the Locust Coal Co., Shenandoah, Pa., has suspended operations because of the high cost of operating, and mine workers have been advised to remove their tools.

This action throws out of work 270 men employed at this mine, which was acquired by the Locust Coal Co. after being abandoned by the Lehigh Valley Coal Co., in 1938.

High operating costs accounted for another closing when the Dyna mine of the Ingle Coal Co., Daylight, Ind., was reported being abandoned. The operation was opened last January but never attained full production.

Company officials blamed the closing on bad mine conditions, government restrictions and "too much John L. Lewis." After the recent union contract was completed the company decided to write off its \$300,000 investment in the property.

### W. Va. Group Meets in Clarksburg

The monthly meeting of the Central West Virginia Coal Mining Institute, held June 21 at the Waldo Hotel, Clarksburg, featured a discussion led by A. E. Condon,



**IT'S HEAVY!**

**RUGGED!**

**POWERFUL!**

## McCarthy BORING MACHINE for Horizontal and Vertical Drilling

- Drills **40%** More Holes per Day
- Bores up to 9" Diameter Holes to Depth of 120 ft. in Ordinary Earth Formation
- Easy to Operate—Saves Many Man-hours
- 4 Types Now Available for Prompt Delivery
- Self-Propelled

### SPECIFICATIONS

**MOTOR** 25 Horsepower Air Cooled Wisconsin Motor. 2000 RPM complete with starter generator and battery.

**TRANSMISSION** Heavy duty truck type—four speeds forward, one speed reverse—special alloy steel clutch and fly-wheel housing. Standard power take-off for operating hydraulic pump.

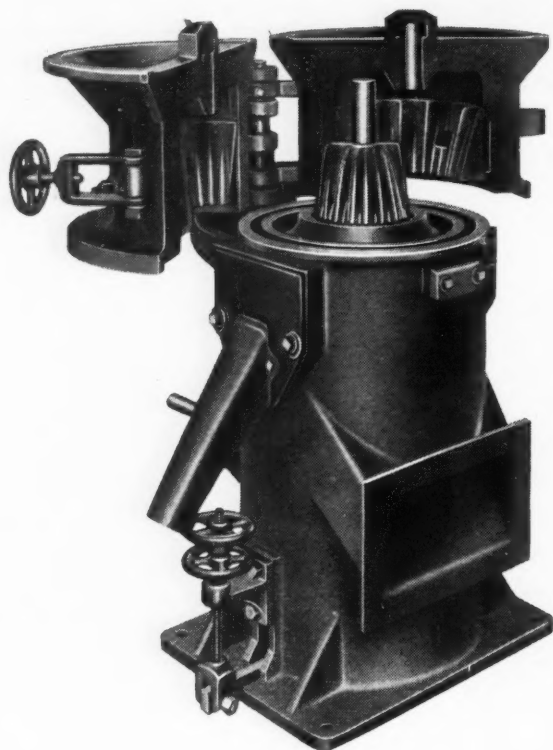
**CARRIAGE** Heavy channels and plate of welded steel construction. Motor mounted directly on top of carriage. Rear end of carriage supports gear and rack mechanism, to which is attached a 5" dia. Hydraulic Cylinder with 35" stroke and 2" dia. piston rod. Due to design, 35" stroke gives carriage a travel of 8'. Gears and racks are of high grade steel—20° involute stub teeth for added strength.

**MAIN FRAME** of heavy channel welded steel construction. Overall length 12'.

**HYDRAULIC UNIT** Driven by power take-off from transmission to hydraulic pump—pressure up to 1000 P.S.I. can be obtained. Carriage is operated by a four-way hydraulic throttling valve. Movement of handle on valve is in same direction as carriage travel. Cylinder equipped with automatic stops on each end of cylinder, eliminating danger of building up excess pressure which may cause mechanical failure.

**ELEVATING JACKS** Four jacks are standard equipment to raise or lower unit and are made of welded steel construction. Mechanism consists of vertical racks engaging pinion which is mounted on worm wheel shaft. Cranks are supplied for turning worms. Worm gearing is self-locking which keeps machine at its desired position.

**SALEM TOOL CO. SALEM OHIO**



Sample 1 Ton of Coal in 1 Hour Automatically  
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- ★ Speed Sampling by Eliminating 32 Hand Operations
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There is no need to guess about the BTU value of coal . . . not when you can get accurate samples in a few minutes with the Sturtevant Automatic Coal Sampler.

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MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

ventilation engineer, Jeffry Mfg. Co., on mine fans, their types, characteristics and applications. A large group of mining men participated in the meeting.

## Anthracite Miners Urged to Produce More

If man-day production is not increased as a result of the new anthracite wage agreement, the new contract will only prove to be the "straw that broke the camel's back" when competition becomes active, employees of the Philadelphia & Reading Coal & Iron Co., were told June 29 in a pamphlet message entitled "Don't Dig Your Own Grave." The men were also reminded that their health and welfare fund depended wholly upon the amount of coal they mined and were warned of the inroads planned by competitive fuels.

### Personal Notes

A. F. Castanoli, for the past 17 years in charge of coal preparation for the Koppers Coal Division, has resigned to join Robinson & Robinson, mining engineers, Charleston, W. Va.

J. D. Whalen has been appointed superintendent, Francis mine, Greensburg-Connellsville Coal & Coke Co., Burgettstown, Pa.

T. W. McGuire, chief engineer, Carbon Fuel Co., Carbon, W. Va., has resigned and is reportedly entering another industry.

The Pittsburgh Coal Co. has announced several changes in personnel. Dave Werner, formerly assistant engineer, shops, has been made outside foreman, Montour No. 4 mine. Joseph Hutchison, assistant mine engineer, has been named assistant mine foreman at Banning No. 1 mine. At Westland mine, Ernest Kuhn, previously assistant mine engineer, and John Fitch, safety inspector, have been appointed mine foremen.

E. D. Benton, formerly fuel engineer, Louisville & Nashville R.R., has been named to the staff of the Battelle Memorial Institute, Columbus, where he will be engaged in research on the utilization of fuel in locomotives. Augustus R. Van Kleeck, previously chemical engineer with Ashland Oil & Refining Co., has also joined the Institute and will conduct research in fuels technology.

Several changes in operating officials have recently taken place at the mines of the Logan County Coal Corp., Slagle, W. Va. Taylor Blair has been promoted from mine foreman to superintendent, and Earl Spencer named chief electrician, at McGregor No. 6 mine. Richard Gray, formerly mine foreman at McGregor No. 2 mine, has been made superintendent, and Richard Keaton has succeeded him as mine foreman. H. M. Perry is now chief electrician at this mine. Damer Johnson has been appointed chief electrician of the Paragon mine. George W. Jones, Jr., has been named master mechanic for all three mines, succeeding Reuben Lee.

D. I. Sisler, manager of the Library, Pa.,

# TOUGH TEAM IN THE PIT

*This "Caterpillar" Diesel D6 Tractor, with bulldozer, has worked 6900 hours in 3 years at Crowe Coal Company's strip mine near Clinton, Mo. Its first overhaul was at 5000 hours.*

**A** "Caterpillar" Diesel Tractor, equipped with bulldozer, and a "Caterpillar" Diesel Motor Grader make a team that's hard to beat on a strip mining operation.

The tractor handles any and all jobs—cleaning the pit floor, smoothing a path for the dragline, pushing coal up to the shovel and building runways for the trucks. The motor grader maintains haul roads for the trucks, not only in the pit but from pit to tippie.

"Caterpillar" Diesels are rugged—dependable—built to stand up in heavy mud and choking dust and keep going 24 hours a day. Efficient performers, economical on fuel and upkeep, they *earn* money and *save* money for their owners.

**CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS**



*A "Caterpillar" No. 212 Motor Grader maintains haul roads in the Crowe Company's mine. This machine has worked steadily for its owners for more than 5 years.*

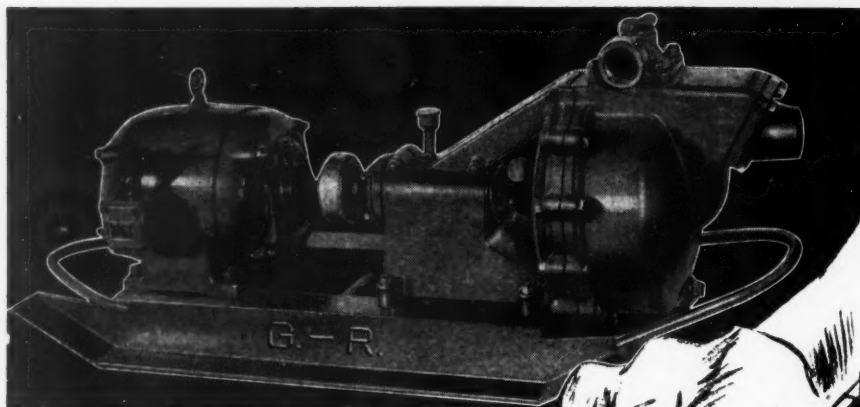


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**PUMPING**  
*Trouble*

Reliability and trouble-free service are necessary requirements in a mine gathering pump. Gorman-Rupp centrifugal pumps are the most simple, rugged, trouble-free units you can buy. They are built according to the expressed needs of experienced mining men and have been given rigid tests to prove the soundness of their design.

Gorman-Rupp pumps have operated continuously for months at a time without any other attention than occasional lubrication. Where head or side clearances are a problem their small size is appreciated. They are automatic self-priming, non-clogging and can be depended upon to operate by automatic or remote control.

Gorman-Rupp pumps are guaranteed to live up to every claim made for them.

Various sizes of Gorman-Rupp pumps are available in capacities from 4,500 to 15,000 gallons per hour and heads up to 125 feet.

Write today for a copy of our special mine pump bulletin No. 301-46 or contact your nearest distributor.

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306 BOWMAN STREET, MANSFIELD, OHIO

Distributed by: Guyan Machinery Co., Logan, W. Va. — Weinman Pump & Supply Co., Pittsburgh, Pa. — McComb Supply Co., Harlan, Ky. — Bittenbender Co., Scranton, Pa. — Industrial Supply Co., Terre Haute, Ind. — Hoe Supply Co., Christopher, Ill. — Central Supply Co., Greenville, Ky. — Ebbert & Kirkman Co., Inc., Birmingham, Ala. — Henszey Co., Watertown, Wisc. — Union Supply Co., Denver, Colo.

store, Champion Stores, Inc., a subsidiary of the Pittsburgh Consolidation Coal Co., has been promoted to merchandising manager in charge of all purchases and merchandising.

Seth H. Kegan, formerly production and cost engineer, has been named superintendent, Mine No. 214, Consolidation Coal Co., McRoberts, Ky., succeeding J. O. Watson, III, who has resigned to become a partner with his brother-in-law, G. W. Merritt, in the Far West Coal Co., Floyd County, Kentucky. Mr. Kegan has served Consolidation for 27 years in many different capacities.

Harry E. Greiseiner has been named chief electrician of the new Buffalo Creek mine (Kentucky) of the United Coal Co.'s.

P. H. Neal, vice president, has been elected president, Alabama By-Products Corp., Birmingham, Ala. T. G. Fear, formerly with the Hanna Coal Co., has been named chief engineer by the company.

Frank C. Carothers has resigned as general superintendent, Russell Fork Coal Co., Pikeville, Ky., and is at present in Florida, recuperating from an illness.

Earl A. Riley, for the past six years sales manager of the Locke Stove Co. while on loan from the Sinclair Coal Co., has returned to Sinclair.

Cecil Wilkinson, superintendent, Huntsville-Sinclair Mining Co., Huntsville, Mo., has become superintendent, Old Mac Coal Co., Red Oak, Okla., a new strip mine opened by the Sinclair company. Don Johnston, superintendent, Hume-Sinclair Coal Mining Co., Hume, Mo., has been transferred to succeed Mr. Wilkinson. Cecil Guthrie, formerly superintendent of the Seneca Coal & Coke Co., Broken Arrow, Okla., becomes superintendent of Hume-Sinclair, and is succeeded at Seneca by L. A. Crump, previously assistant superintendent.

## Disabled-Veteran Plan Matches Men and Jobs

Completion of a Man-Job Matching Technique, based on a nation-wide study of job requirements and the abilities of disabled veterans, has been announced by Dr. Gilbert S. Macvaugh, national employment officer, the Disabled American Veterans, 17 East 42 St., New York.

Outlined briefly, the technique includes: (1) making a physical-demands analysis of a particular job; (2) making an analysis of the remaining physical abilities of a disabled veteran; and (3) matching the veteran and job requirements so as to place the handicapped veteran in a job where his disabilities play no part in his job performance. "In effect," Dr. Macvaugh declared, "this technique rules out the disability."

Through a nation-wide set-up of the DAV National Service Officers this man-job matching technique is offered free to employers throughout the country, and local DAV representatives, familiar with the abilities of unemployed disabled veterans in their areas, will cooperate with employers to place

*Wyoming*

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## RIVETLESS SOCKET FEATHERWEIGHT

*Coal Shovels & Scoops*

### AN ANSWER TO THE MINER'S DREAM

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- 4 - Alloy Steel, Heat Treated Blade.
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WEIGHT

NO RIVETS  
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### "AMES" PRODUCTS

SHOVELS      FORKS  
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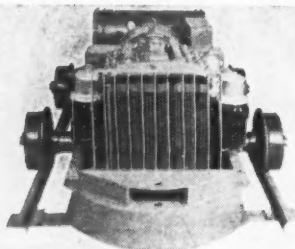
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- 1 Double grip . . . both sides adhesive.
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- 4 Resists abrasion.
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FRONT VIEW OF COMPRESSOR

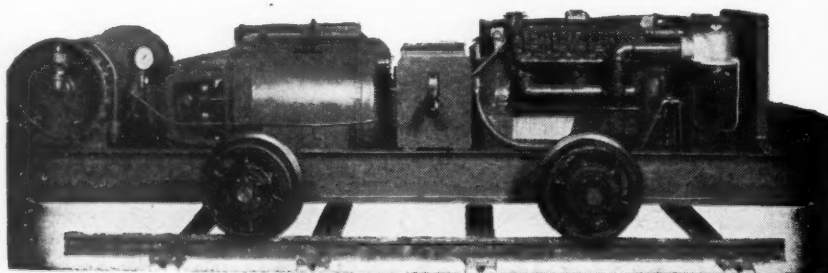
**ACME**  
**"LOWBOY"**  
 Mine Car  
 COMPRESSOR

Here's the last word in mine car compressors—light in weight—low in height—compact—mobile—and delivers 92 cu. ft. of air per minute at 100 lbs. pressure.

It is designed specifically for mine service and is adaptable to both high and low seam operation. It is particularly good in mechanized mines.

The Acme "Lowboy" operates on either 230 or 500 DC current and is equipped with a 25 H.P. motor. The compressor unit is an adaptation of the Schramm Fordair which has been so successful in many construction fields.

For complete information on this modern, efficient mine car compressor giving details of construction and complete specifications write for Bulletin No. 3920.



**ACME COMPRESSOR CO.**  
 Williamson, West Virginia

the maximum number of qualified disabled veterans in useful, self-supporting jobs. U. S. Bureau of Labor statistics, based on recent studies, show that a properly placed disabled veteran is a more reliable and stable worker than the majority of able-bodied workers.

To finance this and other work of the 25-year-old, congressionally-chartered Disabled American Veterans, a National Service Fund of \$10,000,000 is now being raised.

**Obituary**

Stuyvesant Peabody, Sr., 57, president since 1917 of the Peabody Coal Co., Chicago, and long prominent in coal-mining and civic affairs, died June 7 in a Chicago hospital after a month's illness.

W. A. Givens, 60, president, Allegheny Coal & Coke Co., and executive vice president Allegheny-Ludlum Steel Corp., Brackenridge, Pa., died May 29, less than five hours after suffering a heart attack in the company's offices.

Col. William B. Reilly, 69, secretary-treasurer, Duncan-Spangler Coal Co., Spangler, Pa., died May 25 at his home in Philadelphia.

Robert Daniels, 50, chief of police, Glen Alden Coal Co., Scranton, Pa., died June 2 in the Wilkes-Barre General Hospital of complications following an operation a week previously.

Franklin Ross Scholl, Sr., 45, general superintendent, C. H. Mead Coal Co., died June 2 at his home, East Gulf, W. Va., after an illness of several weeks.

Edward Allais, Sr., 80, who retired in January, 1946, as president of the Columbus Mining Co., Hazard, Ky., died June 21 at his home in Terre Haute, Ind., after an illness of several months.

Joseph B. Martin, general superintendent, Jermyn-Green Coal Co., Pittston, Pa., died June 21, following a heart attack.

**Preparation Facilities**

HOMESTEAD COAL CO. Homestead Mine, St. Charles, Ky.—Contract closed with McNally-Pittsburg Mfg. Corp. for complete preparation and washing plant to clean both No. 11 and No. 12 West Kentucky seams at rate of 900 t.p.h. and 750 t.p.h. respectively, using McNally-Norton automatic washers in compound circuit for washing 7x0-in. coal; washed coal to be classified and dewatered into five sizes for loading, with mixing and crushing facilities;  $\frac{1}{4}$  mm. minus to be recovered and dewatered by two McNally-Carpenter centrifugal dryers.

UNION COLLIERY CO., Dowell, Ill.—Contract closed with McNally-Pittsburg Mfg. Corp., for complete preparation and washing plant for cleaning 6x0-in. coal at rate of 500 t.p.h.; run-of-mine feed at 760 t.p.h.

# Don't leave it to chance

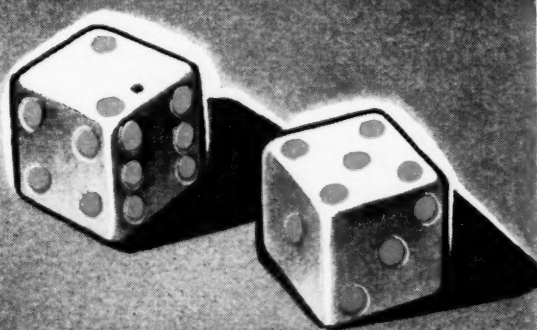
## LEAVE IT TO - HY-TEST

### THE SAFETY SHOE WITH THE ANCHOR FLANGE

### STEEL BOX TOE



...This flange adds extra strength to the steel arch's sidewall. Anchored between insole and outsole, it also serves to resist shifting and tilting when toe is struck at an angle.



**IN DICE**—the odds are 6 to one against rolling a seven; 9 to 1 against five or nine; 7.2 to 1 against six or eight; 12 to 1 against 4 or 10; and 36 to 1 against 12 or 2.

A worker loses only his money when he gambles at dice, but his life is at stake when he gambles with accidents. That's why workers put the odds in their favor when they put Hy-Test Safety Shoes on their feet. The scientifically designed Anchor-Flange Steel Box Toe is an extra margin of safety when accidents strike. The flange adds still further strength to the sturdy steel arc that covers the toes, and it provides a tilt-resisting, shift-resisting anchor-

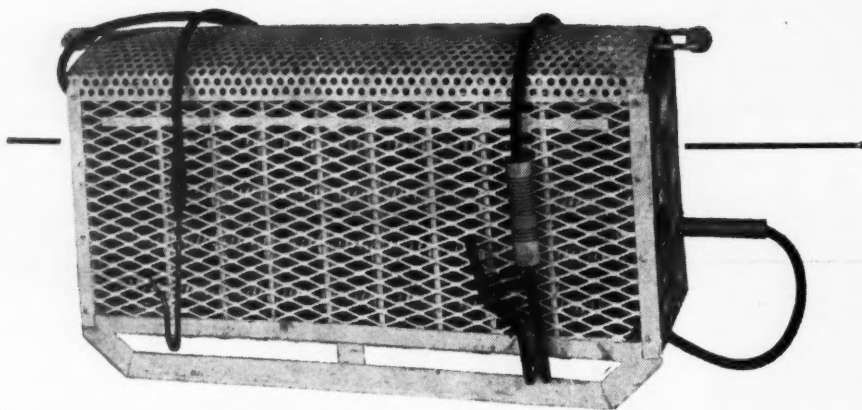
age that spells extra protection for Hy-Test Safety Shoe wearers. Thousands of workers are in perfect foot health today because they had foresight to wear Hy-Test Safety Shoes on hazardous jobs... and more people wear Hy-Test than any other safety shoe. Let the Hy-Test representative tell you about the in-plant service that makes it so easy to have this foot protection for men and women in your plant. Drop us a card. No obligation.



THE WORLD'S LARGEST SELLING SAFETY SHOE

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The G.M.C. Portable Arc Welder can be brought to the job, hooked up, used and moved out easily and quickly. Handles are located conveniently away from the coils, eliminating wasted time waiting for the unit to cool off. Coils are protected from all sides and the unit is sturdily constructed to take hard use. If you are looking for a practical portable Arc Welder this is the answer!

**G.M.C.** *Portable* **ARC WELDER**  
for 250 or 500 Volt D. C.

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MORE EFFICIENT  
than average Storage  
Battery Locomotive"*

#### FEATURES

Double knee-action; better track-ability. Floating power; less power consumption. Quick acting footbrake, essential for quick stopping, especially behind loading machines. Brake shoes that follow the wheels (due to knee-action). Adjustable Timken Bearings throughout. Huskiest transmission in any storage battery locomotive. Never leaks oil. Never add oil. Use regular auto oil; change every 6 months. Strong. Simple Design. Low maintenance. Backed by over 25 years of experience with Storage Battery locomotives.

**MORE  
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The Greensburg "Monitor" Type is the first real improvement in storage battery locomotives. ENTIRELY NEW IN DESIGN. Its efficiency and economy have been proven in actual mine use. Operators report 20 to 25% more coal hauled than with other battery locomotives having the same battery capacity. From 6 to 10 ton capacities; track gauges 36" to 56 1/2". Other locomotives from 1 1/2 tons to 10 tons, 16" to 56 1/2" track gauge.

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*Makers of Custom-Built Storage Battery Locomotives*

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with automatic surge-bin equipment to absorb differential between r.o.m. feed rate and rate of feed to washing plant, consisting of McNally-Norton vertical pick breaker for reducing 6-in. plus to 6-in. minus prior to washing in McNally-Norton automatic washers in compound circuit; washed coal classified into six grades; two McNally-Carpenter centrifugal dryers for drying finer stoker grades; complete with blending and stoker-coal crushing facilities. Collaborating engineers, Robinson & Robinson, Charleston, W. Va.

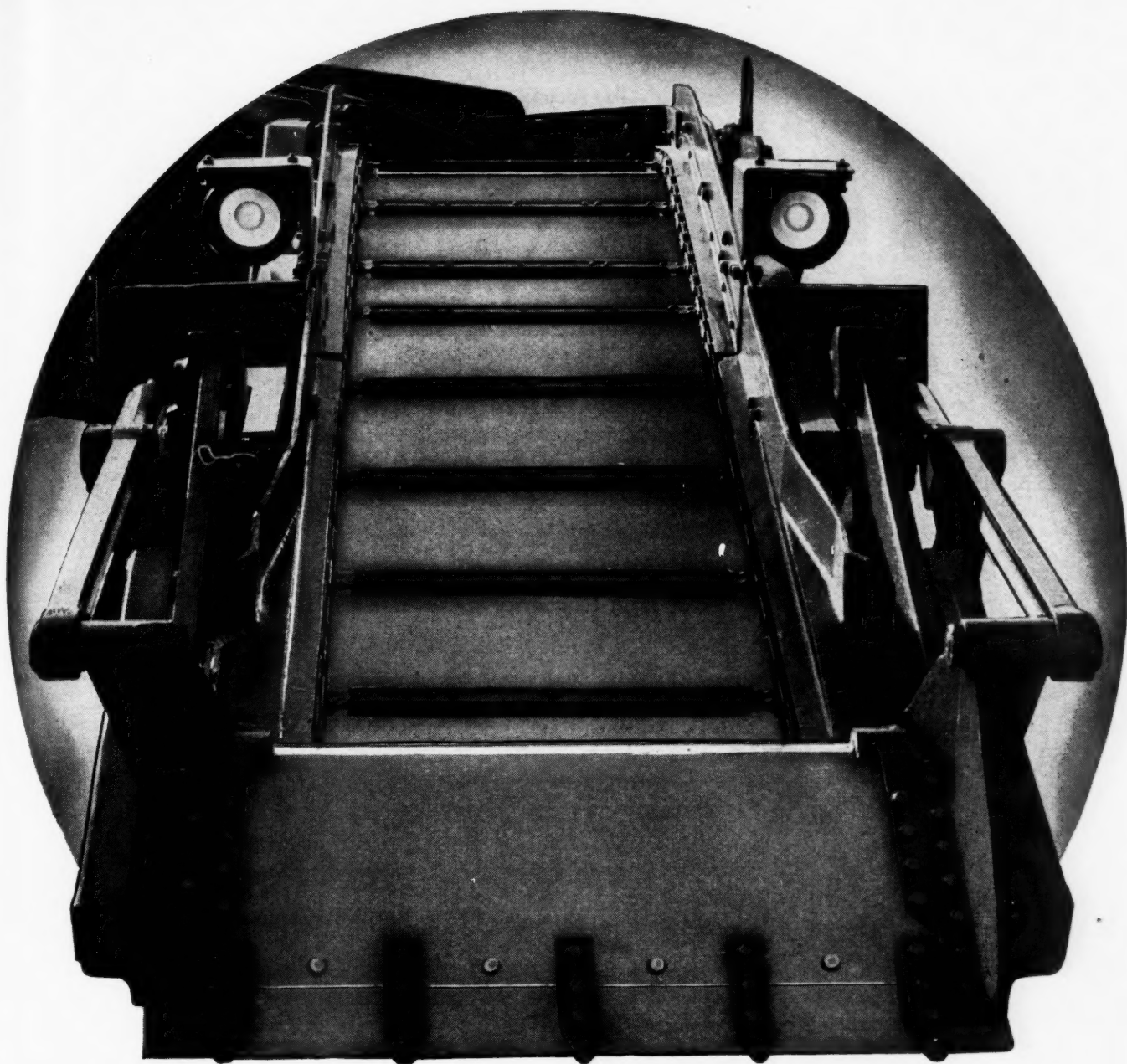
TRUAX-TRAEER COAL CO., Burning Star Mine, Elkville, Ill.—Contract closed with McNally Pittsburg Mfg. Corp. for complete McNally-Rheo fine-coal plant with prescreening equipment having 85-t.p.h. capacity to prescreen 3/4-in. at 1/2-in. plus and 1/2-in. minus; the 1/2-in. minus to be treated in McNally-Rheo free discharge launders at 65 t.p.h.; 1/2-in. minus centrifugally dried in three McNally-Carpenter centrifugal dryers and recombined with the 3/4-in. washed coals; hydraulic refuse disposal and complete water-handling facilities.

#### Coal Publications

Abatement of Coal Dust in Pillar Workings by Means of Water Infusion at Low Pressure, by R. P. Jack, Commonwealth Coal Commission, Canberra, Australia. 22 pp., 5 1/2 x 8 in.; paper. Describes method of dampening coal dust in the heart of coal pillars by forcing water into them through long boreholes. Density of dust clouds raised in extraction of such pillars is thus reduced.

Blending Properties of Low- and Medium-Volatile Coals as Determined in the BM-AGA Apparatus, by D. A. Reynolds and J. D. Davis, U. S. Bureau of Mines. R.I. 3936; 23 pp., 8 x 10 1/2 in.; paper; mimeograph; free. Results of BM-AGA tests at 900 deg. C. of 12 low-volatile, 8 medium-volatile and 26 high-volatile coals and their blends, with shatter and tumbler indexes of their cokes. Low-volatile and medium-volatile coals have equal average coking powers, whether carbonized separately or blended with Pittsburgh-bed coal. Medium-volatile coals are not to be regarded as undesirable for coking, because, in general, most of such coals, if they coke strongly, will make just as strong coke as the strongly coking coals of any other rank, if carbonized without admixture with other coals. Blends of low-volatile coals, while they yield more coke, produce less tar, light oil and gas than blends with equal proportions of medium-volatile coals.

Control of Bulk Densities in Coke Ovens: Studies on Precision and Application of Varying Testing Methods, by H. S. Auvil, L. D. Schmidt and H. G. Graham, U. S. Bureau of Mines, R.I. 3935; 29 pp., 8 x 10 1/2 in.; paper; mimeograph; free. No method for evaluating the effect of density on coke strength gives results as good as the new dropped-coal method. Though less precise than previous methods, it duplicates actual oven densities with greater fidelity than other methods, though these latter produce results that can be more accurately compared. The more precise methods might be preferable, if they gave results that parallel actual oven



## Mr. Operator . . . let your choice of a loader rest on **SERVICE-ABILITY**

All the requirements of the mechanical loader you need should be hooked together in one chain called "Service-ability". Then, by comparison, check each link for a weak one before you decide to buy.

1st—Will the loader you buy load any size lump of coal that will pass through your tippie?

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3rd—Will it give you maximum production in either of the above services?

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6th—Will it give you maximum production at minimum power consumption—1/5 KWH Per Ton of material loaded?

Only the Whaley "Automat" meets all six of these vital requirements—each one a full size, strong link in your chain of requirements for top **SERVICE-ABILITY!**

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*Mechanical Loaders*

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*For Over 38 Years*



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Mr. Employer, do you have your daily operations insured from an employer-employee standpoint?

Workmen's Compensation is necessary, and in most cases compulsory... then there are individual or group policies for your personnel... and our new Underground Property Damage policy that protects YOU against loss or damage to all equipment underground—damage to shafts, passageways, retimbering

and repairing inside structures—plus damage to property above ground as result of an explosion underground.

Our Safety Engineers, authorities in their field, offer you suggestions as to the prevention of accidents in your operations.

We are proud of our record of claims service—not only for coal mining companies, but for commercial and industrial organizations, too. From the most serious claims to the smallest ones, we keep in mind the rights of the employer as well as the employee.

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A special vehicle for underground transportation of personnel. Handles five men. Hauls men to working face quicker, without fatigue, enabling them to do a better job.  
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bulk densities closely enough to allow the use of corrective factors.

Mineral Resources of Japan, Foreign Minerals Survey, Vol. 2, No. 5, U. S. Bureau of Mines, 118 pp., 8x10½-in. with 10 folded inserts and 4 pocketed maps; mimeograph, paper cover; free\*. In 1943, Japan produced 52,000,000 metric tons of coal (estimated). The reserves of all kinds of coal are 16,691,333,000 tons in Japan itself; 17,417,030,000 in Manchuria; 1,998,000,000 in Karafuto; 1,740,000,000 in Korea and 440,000,000 in Korea, all metric tons.

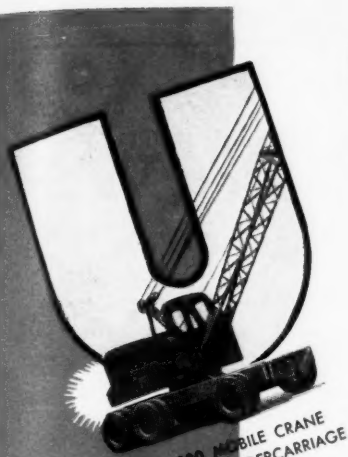
Management Can Be Human, by H. Stowers. McGraw-Hill Book Co., 131 pp., 5½x9-in.; cloth. Price, \$1.50. Part of Industrial Organization and Management Series. Common-sense advice for establishing better relations between management and workers, thereby reducing production costs and improving quality of work.

Building an Engineering Career, by C. C. Williams, McGraw-Hill Book Co., 309 pp., 6x8-in.; cloth. Price \$2.50. This book relates to choice of an engineering profession and aptitude for it, salaries paid to those engaged in the several kinds of engineering, fitting of the mind for the profession by study and use of library, obtaining of employment, past and future of engineering.

Effect of Relief Vents on Reduction of Pressures Developed by Dust Explosions, by I. Hartmann and J. Nagy, U. S. Bureau of Mines, R. I. 3924; 36 pp., 8x10½-in.; paper, mimeograph free\*. Disregarding the effects of the chemical and physical properties of dusts, violence of a dust explosion in a given enclosure will depend on the conditions under which the cloud of explosive dust is formed, particularly by the uniformity with which its particles are distributed, the position and nature of the source of ignition, the timing of the ignition relative to cloud formation and the concentration of the dust in the cloud. This explains why, when initiated by short sparks, explosions are not as violent as they are when the ignition source delivers a sufficient quantity of heat to raise the greater part of the dust cloud to the temperature at which the material will ignite. When the right quantity of dust is suspended, higher pressures will be obtained. For this reason, explosions usually are less violent when prematurely started or when some of the dust needed for maximum explosive violence has settled. Under the test conditions, the several dusts tested produced the strongest explosions when their concentrations ranged from 0.2 to 0.5 oz. per cubic foot of the inclosed air volume. Under these conditions, the explosive violence of magnesium, atomized aluminum, phenol-formaldehyde resin, corn starch, soy-bean protein, wood flour and coal dust ranged in the order named, with coal dust the least violent and magnesium the most violent. One means of reducing structural and other damage is by relief vents, by which the pressure of an incipient explosion can be quickly reduced.

Nursing in Commerce and Industry, by B. J. McGrath. The Commonwealth Fund, 41 E. 57th St., New York. Academy of Medicine, 356 pp., 6x9½-in.; cloth. Price \$3.

\* Apply U. S. Bureau of Mines.



UNIT 1020 MOBILE CRANE  
WITH 3 AXLE UNDERCARRIAGE  
10 TON CAPACITY



UNIT 1020 MOBILE CRANE  
WITH 2 AXLE UNDERCARRIAGE  
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UNIT 357 MOBILE CRANE  
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5 TON CAPACITY



UNIT 1020 TRUCK CRANE  
MOUNTED ON 3-AXLE TRUCK  
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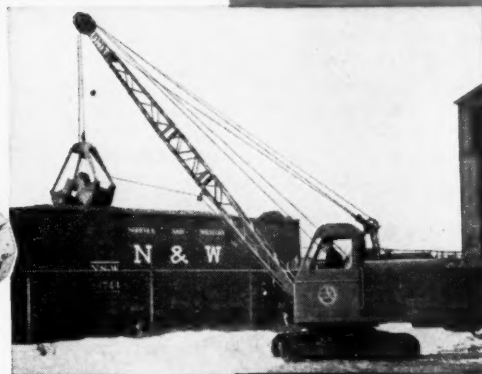
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ONE PIECE CAST GEAR CASE



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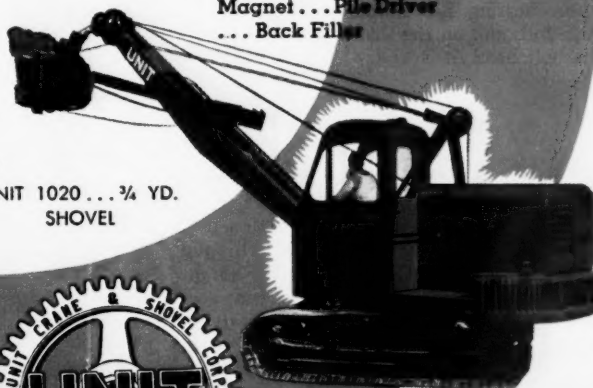
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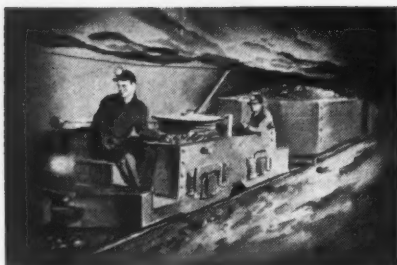
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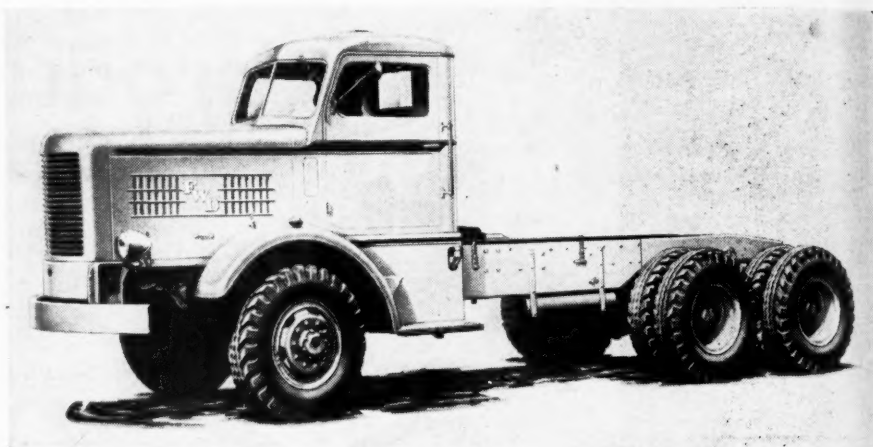


# Equipment News

## Trucks

The Four Wheel Drive Auto Co., Clintonville, Wis., has announced that its 1946 model FWDs are being built in three major weight classifications ranging from 3 to 15 tons rated capacity. FWDs in the H series line, classified as light-heavies, are rated at 3 and 4 tons capacity. U-series FWDs are being built in the 5-ton classification. The company's M-series trucks are being built with a rated capacity of 10 tons.

FWD six-wheel-drive tractors and trucks rated at 15-tons capacity also are included in the company's standard line and are available for immediate delivery, it is stated. The 1946 FWD has been completely restyled for improved appearance and utility, according to the company. Salient features of this restyling include modernized radiator grills, streamlined fenders and skirting and the new, more comfortable "Universal Safety Cab." Axles, transmissions and frames also have been redesigned and re-engineered for greater safety, speed and durability.



## Tooth Points

Its new reversible center-shank tooth point is a distinct improvement in the design and construction of tooth points for dragline service, states Page Engineering Co., Clearing Post Office, Chicago 38, Ill. The new hook-bolt fastening is especially designed so that the bolt will not wear or tear loose from the point. This new tooth point will never come loose or work off if 25-percent minimum bearing is maintained both on the stub ends and on the shank above and below the bolt head, it is said.

## Air-Hose Check Valve

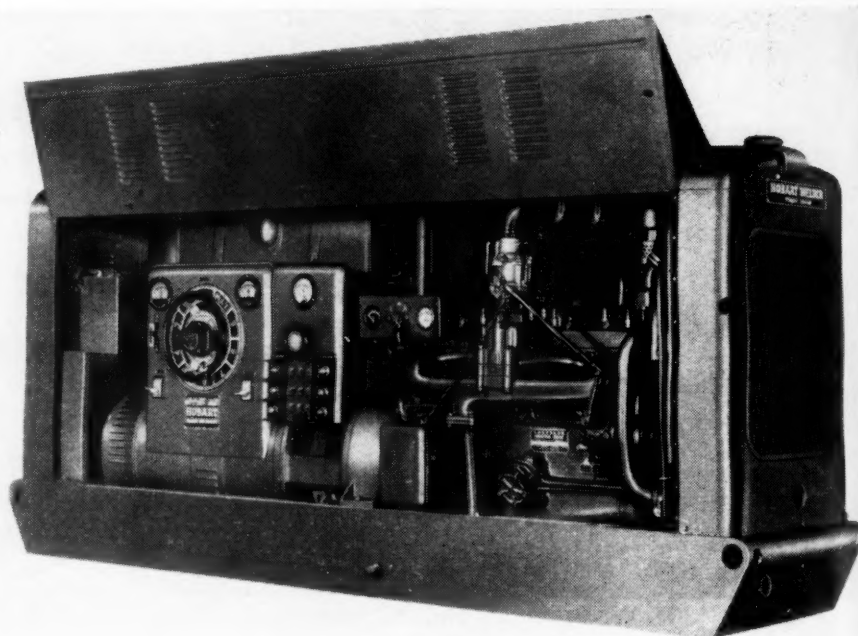
The Numatic Safety Check, designed to eliminate the danger of wildly whipping compressed-air hoses by shutting off air immediately in the event of excessive flow of air caused by accidental disconnecting or rupture in the air line, and to obviate the possibility of damage to compressors or manifolds through travel-back or whipping action in hoses, has been announced by the Hackett Mfg. Co., Oakland, Calif. There are only two main parts in the Numatic Safety Check, the housing and a steel ball. Excessive flow of air through the valve causes the ball to roll up the slope, to the port, shutting off air to the line. When the pressure

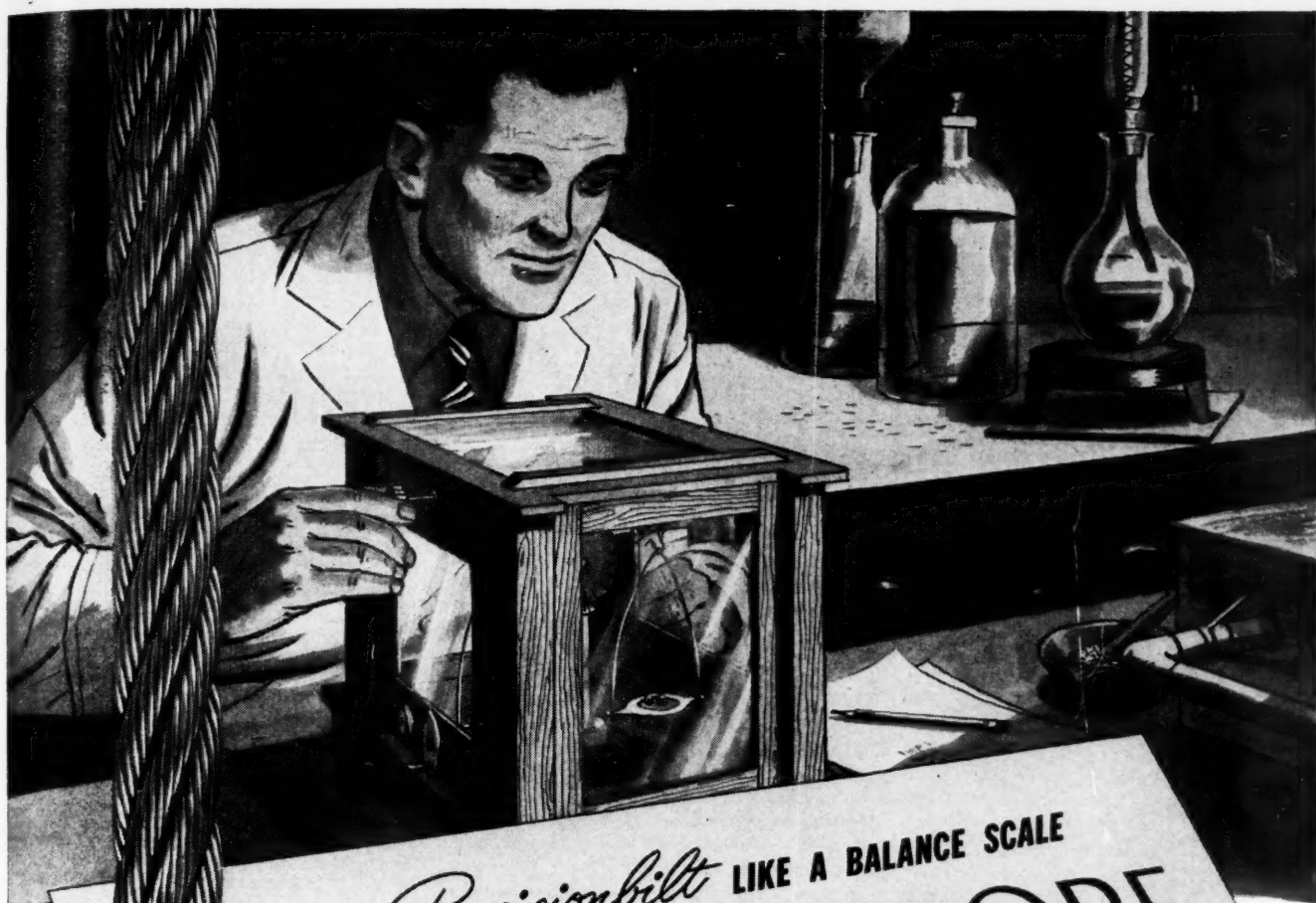
is nearly equal, the ball drops away from the port and rolls back down into the sump.

According to the manufacturer, the unsafe and costly practice of crimping hoses to shut off air while changing tools is eliminated as the Numatic Safety Check simply shuts off air when the tool is taken off the line. Bad leaks in lines are revealed before they can cause damage and inefficient tools which waste air will not operate. And because loss of air is minimized, wear on compressors is cut down considerably. The Numatic Safety Check is manufactured for working pressures up to 250 lb. and comes in standard  $\frac{1}{2}$ -in. and  $\frac{3}{4}$ -in. sizes.

## Welder-Generator

Hobart Bros. Co., Troy, Ohio has announced development of a 300-amp. gasoline-driven arc welder with an inbuilt auxiliary a.c. generator. The manufacturer states that this compact, high performing design has resulted from taking advantage of the Hobart oversize separate exciter—using it to supply excitation to both the welding generator and the a.c. generator. By properly connecting the stations and panel of the a.c. generator, it is possible to furnish the following combinations of power simultaneously: 110 volts, 60 cycles, single phase;





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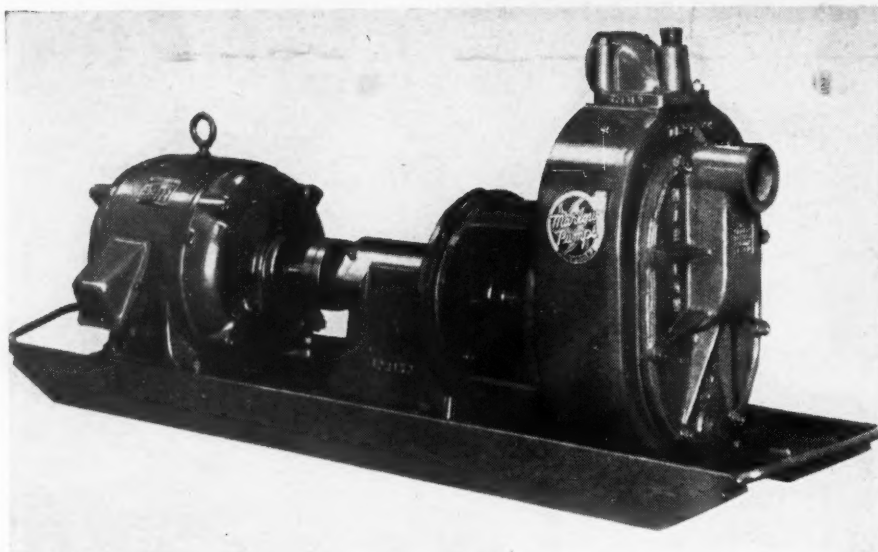
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110/220 volts, 60 cycles, single phase, three wire; 220 volts, 60 cycles, single phase; 220 volts, 60 cycles, three phase. The panel provides receptacles and studs for connecting to the power required, an a.c. voltmeter with dual scale, frequency meter and rheostat for controlling the a.c. voltage. This auxiliary a.c. generator is available in two sizes, 6 and 12 kw.

## Gathering Pump

A new and improved mine gathering pump said to cut mine drainage costs substantially is now made by Marlow Pumps, Ridgewood, N. J. It self-primers without ports, by-passes or other auxiliary devices. There is no recirculation or wasted motion and no parts require adjustment or manipulation, according to the manufacturer. The impeller alone moves the liquid and its simple, efficient design prevents clogging, jamming or other problems. It is completely self-priming on suction lifts as high as 25 ft.

The Marlow Type EM mine gathering pump is available in two sizes: 2-in. with 2-hp. and 3-hp. motors and 3-in. with 2-hp. and 3-hp. motors. All operate at 1,800 r.p.m. Pump and motor on a sled-type base

measure 23 $\frac{1}{4}$  in. high, 12 $\frac{3}{4}$  in. wide and 57 in. long. Capacity is 40 to 240 g.p.m.

According to the manufacturer, the pump can be located easily in a small space within a mine and can be positioned virtually anywhere because the discharge tee is constructed so it can be used in any horizontal position 90 deg. apart and the discharge hose may lead away from the pump in any direction. All pump parts that come in contact with water are constructed of acid-resistant bronze to offset the corrosive effect of mine waters. The pump is fitted with a four-vane open-type impeller especially designed to prevent clogging. Both the impeller and the diffuser that surround it can be replaced at very low cost and the pump fully restored to original high efficiency, it is said. For sweet-water mines, an all-iron pump (Type EL) can be furnished with an iron or bronze impeller. A bulletin is available from the manufacturer on request.

## Power Shovel

Marion Power Shovel Co., Marion, Ohio, has announced a new 3 $\frac{1}{4}$ -cu.yd. power shovel—Type 111-M—for heavy duty service in mining, quarrying, stripping and general

construction. The new machine, according to the manufacturer, fills a long-felt need for a diesel-powered machine in this size which can be readily shipped without major dismantling and which is also quickly convertible to dragline or clamshell service.

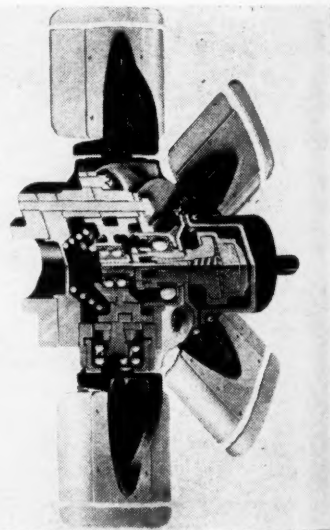
The 111-M shovel is said to be of all-welded construction with a balance in design providing for low center of gravity, making the machine stable under all digging conditions. Particular care has been given to the requirements in heavy duty service for speed, power, ease of control and maneuverability. Variable crawler widths and lengths are offered, making the machine adaptable to individual job requirements. It can quickly be converted to dragline, clamshell or crane service.

The Type 111-M diesel-power plant, in combination with Marion air control with fully-compensating type valves, places heavy-duty power at the disposal of the operator with a minimum of tiring physical exertion on his part, according to the manufacturer. Control-lever pressure is held to approximately 12 lb. maximum. An independent live boom hoist may be supplied with the Type 111-M for crane service. It is completely independent of all other motions.

## Engine Fan

A front-operating adapter design of the thermal power element in the Evans Thermo-Control fan has been announced by the Evans Products Co., 15310 Fullerton Ave., Detroit 27, Mich. The new model has been engineered to simplify installation of the Thermo-Control fan in existing engine mounts when necessary clearances are available, according to the manufacturer.

The fan is a variable-pitch self-adjusting fan operated by a built-in thermal-power ele-



ment. Adjusting itself to changes in engine and ambient temperature, the fan maintains near-constant engine operating temperature, increasing horsepower output, reducing fuel, lubricating oil and maintenance costs and eliminating nearly all formation of sludge deposits in engine and lubricating oil, it is said. The fan is manufactured in four-, six- and eight-blade models and is designed for installation on such heavy-duty equipment as large trucks and buses, diesel-electric loco-



# When It Comes to Mining Coal...

WITH A front end that means business, with a revolving frame that affords a real backbone for tough digging, and with 3-motor drive and full Ward-Leonard control, the Bucyrus-Erie 2½-yard 54-B has both the strength and the speed needed for many years of high-speed loading and stripping service. Easily converted to dragline in the field, the 54-B is "years ahead" because its design is based on a scientific analysis of the work it must do.

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A SPECIAL 4-yard coal dipper plus 54-B efficiency means outstanding speed on this coal-loading operation.

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For Sustained  
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He can't tell how good it is  
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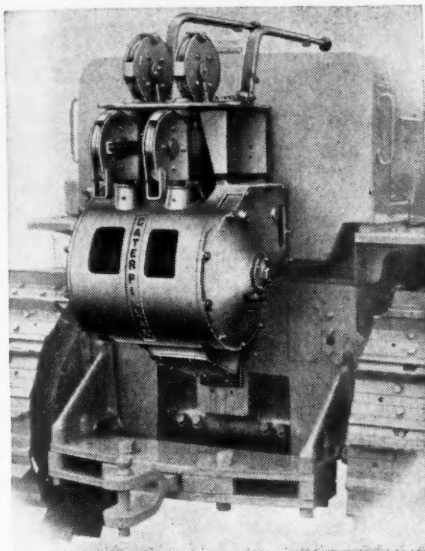
**THE PATENTED, SURFACE-SENSITIZED PERMISSIBLE**

motives, generators, pumping units, shovels, tractors and cranes.

## Cable Control

A new rear double-drum cable control has been announced by the Caterpillar Tractor Co., Peoria, Ill. The unit, designated as the No. 25, embodies numerous refinements and features designed for the heaviest service imposed on Caterpillar diesel D8, D7 and D6 tractors in the operation of the largest scrapers, bulldozers and rippers and results in smoother, easier operation with a minimum of adjustment, according to the manufacturer.

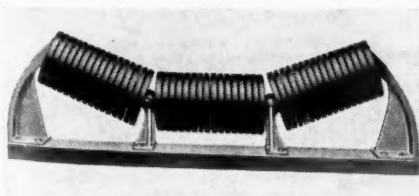
Designed to permit rapid free spooling when desired, the control responds quickly, it is said, with a minimum of effort that



virtually eliminates operator fatigue from this operation. Other outstanding features of the rear-cable control include large-diameter specially grooved sheaves, large brake capacity, longer life through use of anti-friction bearings and recessing of cable drums in the case, compact design permitting mounting close to the tractor for protection against damage and improved balance and a strong cast-steel case assuring freedom from distortion.

## Troughing Idler

A newly designed impact-cushioning troughing idler for belt conveyors is now being manufactured by Chain Belt Co., 1600 West Bruce St., Milwaukee 4, Wis. Known as the Rex Style No. 35 idler, the unit used under the loading point will protect and greatly lengthen the life of the conveyor belt, according to the company. Each roll consists of a rubber cylinder vulcanized directly to the assembly tube. The cylinder has

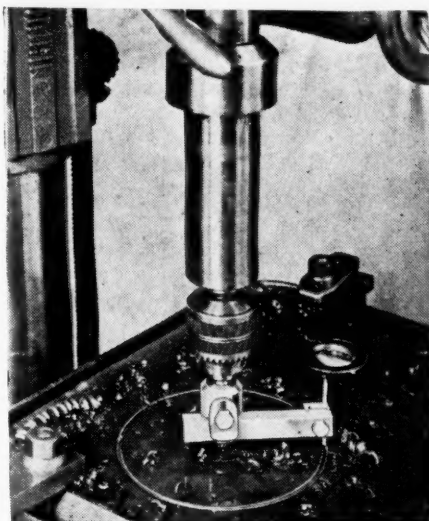


multiple grooves molded into it—deep primary grooves for maximum cushioning to guard against belt carcass rupture and shallow secondary grooves to provide surface softness for protection against belt-cover laceration.

For all loading conditions, it is stated, the cushion idler should be used to support the belt directly under the loading point. The manufacturer recommends that three to four units be used, spaced at one-half the normal idler spacing. Each roll is equipped for high-pressure grease lubrication and is regularly furnished with a hydraulic-type fitting. The grooving permits greatest possible deflection under impact without impairment of roll stability, and the momentary displacement of the rubber instantaneously absorbs the energy of the blow, thus dampening the impact force, the manufacturer states.

## Hole-Cutting Tool

A new all-purpose adjustable hole-cutting tool, announced by Bruno Tools, 9330 Santa Monica Blvd., Beverly Hills, Calif., is said to quickly cut smooth large-size holes in wood, steel, brass, hard rubber, aluminum, fibre, plastics and problem materials which might otherwise necessitate use of torches or other expensive equipment. The Bruno Adjustable Circle Cutter cuts holes to any diameter from 1 7/8 in. to 8 in. through 1/4-in. thickness in steel or other tough metals and any thickness up to 1 1/2 in. in plastics, fiber or wood, and thickness capacities may be doubled, according to the manufacturer, if the cut is taken from both sides of the material. The tools are designed to operate in any standard drill press, woodworking machine, or suitably mounted spindle ma-



chine. The twin-blade holder (fixed 1/2-in. center) cuts washers, wheels, discs and gaskets in one operation.

## Respiratory Device

Firemen, rescue workers and others who may be called upon to work in air that is deficient in oxygen or filled with poisonous gases can now be equipped with a respiratory breathing apparatus that generates its own oxygen and, therefore, makes the wearer



The low-cost hard-facing alloy that SAVES LIFE OF ALL EQUIPMENT

Wherever earth abrasion with impact is encountered STOODDY SELF-HARDENING provides the extra wear protection that keeps all heavy equipment on the job—saves wear and tear, shut-down time and unnecessary replacements!

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EXCEPTIONALLY STABLE ARC with either DC or AC machines • GOOD BOND over a wide range of amperages • NO SLAG INTERFERENCE • MORE RAPID DEPOSITION RATE than dipped type electrodes • CAN BE HANDLED IN ALL POSITIONS • SOLID, DENSE DEPOSITS with an absolute minimum of porosity • SELF LIFTING SLAG as deposits cool • NO LOSS OF HARDNESS OR WEAR RESISTANCE on multiple layers.

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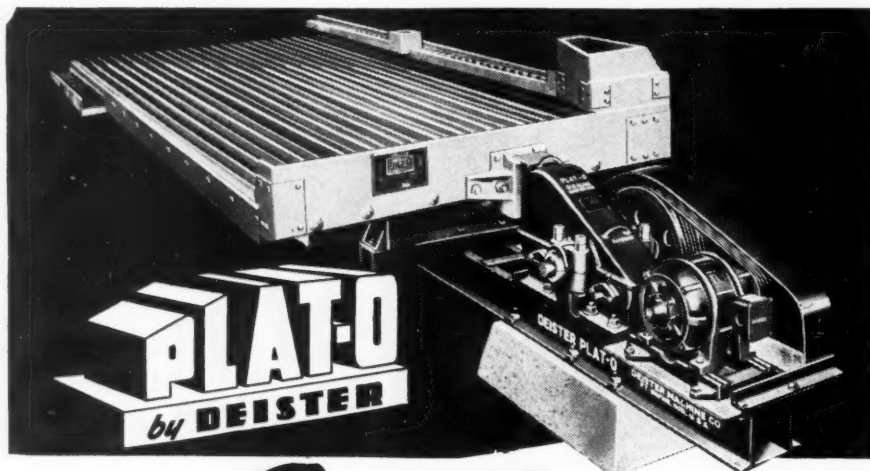


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completely independent of both the surrounding atmosphere and the conventional hook-up with a cylinder of high-pressure oxygen, according to announcement of the new device manufactured by the Mines Safety Appliance Co., Pittsburgh 8, Pa.

Developed during the war to meet the Navy's needs, the device has a canister containing a chemical that immediately reacts with the moisture in the wearer's breath to evolve a plentiful supply of oxygen. In addition to supplying oxygen, the new respiratory device removes the carbon dioxide from the wearer's exhaled breath. The oxygen supply generated is sufficient to meet the heaviest demands over a period of one hour. Before the capacity of the device is exhausted, an alarm bell rings to warn the wearer to withdraw to breathable air.

## Tubing Coupling

A simple, fool-proof coupling said to make possible 10-sec. joining and disconnecting of individual sections of flexible tubing has been developed for Spiratube, the non-collapsible, retractable tubing manufactured by Warner Bros. Co., Spiratube Division, Bridgeport 1, Conn.

The Warner coupling is built into the tubing, eliminating the need of fittings, and is a flat spring-steel collar that may be compressed to slip inside the end of another section and then released to form a strong, tight joint. The sections, it is stated, are easily disconnected by compressing the inner spring-steel collar and withdrawing the male end. Like the rest of the tubing, the



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- ... Direct port opening
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- ... Freedom from attack by fluids being handled
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- ... Made in a complete line. Sizes from ½" to 24" for pressures from 175 to 5,000 psi., and for vacuum requirements

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The lapped surfaces of the valve are "pressure sealed" when the valve is in either the open or closed position. By turning the lubricant screw, lubricant is forced under high pressure through a grooving system that completely encircles the ports as well as the top and bottom of the plug.

The lubricant seals the valve against

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Number 1700 (illustrated) is a Steel-iron valve, wrench operated, designed for a working pressure of 200 pounds WOG (water, oil, or gas). Valves are available in either screwed or flange types. Screwed type have API line pipe thread lengths. Flanged type (No. 1700F) is faced and drilled to American Standard for 125-pound cast iron flanges unless otherwise specified.

For further information about No. 1700 as well as the complete line of Walworth Lubricated Plug Valves, write for catalog.

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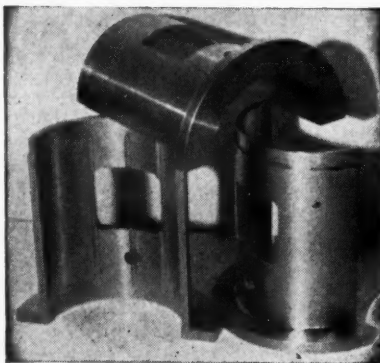
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couplings are covered with long-fiber duck fabric which has been processed to be fire-resistant and is coated with a tough, durable thermoplastic. There is no exposed metal inside or out, which makes Spiratube safe in the presence of explosive or inflammable materials and eliminates sparking hazards, it is said. Spiratube is furnished in standard diameters from 3 in. to 16 in. and in lengths of 10, 15 and 25 ft.

## Drills

Paris Mfg. Co., Paris, Ill., has announced details of its latest Parmanco vertical and horizontal drills. The vertical unit has its drill and winch on a movable bed that allows the drilling and auger-pulling operations to be done without moving the position of the machine. This feature completely eliminates loss of time in hole and drill-shaft realignment after augers have been pulled for cutting samples and allows quick, easy sample procurement at desired depth intervals, it is said. In a recent field test, according to the manufacturer, this machine drilled 25 ft. of overburden and obtained accurate samples in 30 minutes within 3 ft. of a hole of the same depth that had taken eight days to drill and sample by hand.

The horizontal drill is equipped with a complete mechanical feed both for drilling and retrieving. Two speeds are incorporated in the feed transmission and gearing: a drilling speed of 2 to 3 f.p.m. and a retrieving speed of 24 f.p.m.

The mechanical feed uses only 1 1/2 hp. from the shaft of the 25-hp. engine as against other types of feeds using 5 hp., it is said, and the mechanical transmission-feed eliminates all oil-leak maintenance plus giving absolute finger-tip control to operation. A separate two-speed heavy-duty transmission is used for drilling and traction drive also is standard on this drill. Bulletins on both types of drills are available on request to the manufacturer.

## Industrial Notes

CHICAGO PNEUMATIC TOOL CO., New York, has elected W. Luther Lewis, executive vice president since 1931, president to succeed H. A. Jackson, chairman of the board of directors for 14 years, and president of the company for 28 years. Mr. Jackson continues as chairman of the board of directors.

LINK-BELT Co., Chicago, has announced that George P. Torrence rejoins the Link-Belt organization on July 1, 1946 as executive vice president, and will become president of the company Nov. 1, 1946, at which time William C. Carter retires as president. Mr. Torrence was with the Link-Belt Co. from 1911 to 1936, when he resigned as president. He has been in Cleveland since 1936 as vice president and general manager, Rayon Machinery Corp., a subsidiary of the Industrial Rayon Corp., and as president of the Cleveland Pneumatic Tool Co.

INTERNATIONAL HARVESTER Co., Chicago, has announced major changes in both per-

# FLEXIPIPE

The improved flexible tubing for  
 mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by a more rigid means of face ventilation.

Write for free sample and full information

## BEMIS BRO. BAG CO.

412 Poplar Street, St. Louis 2, Mo.



"Yes, You heard correctly!"

## IMMEDIATE DELIVERIES

of these **MESCOWELD RAIL BONDS**

- M8-F  
UNIVERSAL TYPE
- M8X-F  
COMBINATION TYPE
- M5-F  
DUCK BILL TYPE
- M12-F  
ECONOMY BOND

Twelve other types available for shipment with minimum delay. Write for catalog, or phone HEmlock 8332 for complete details.

## MOSEBACH ELECTRIC & SUPPLY CO.

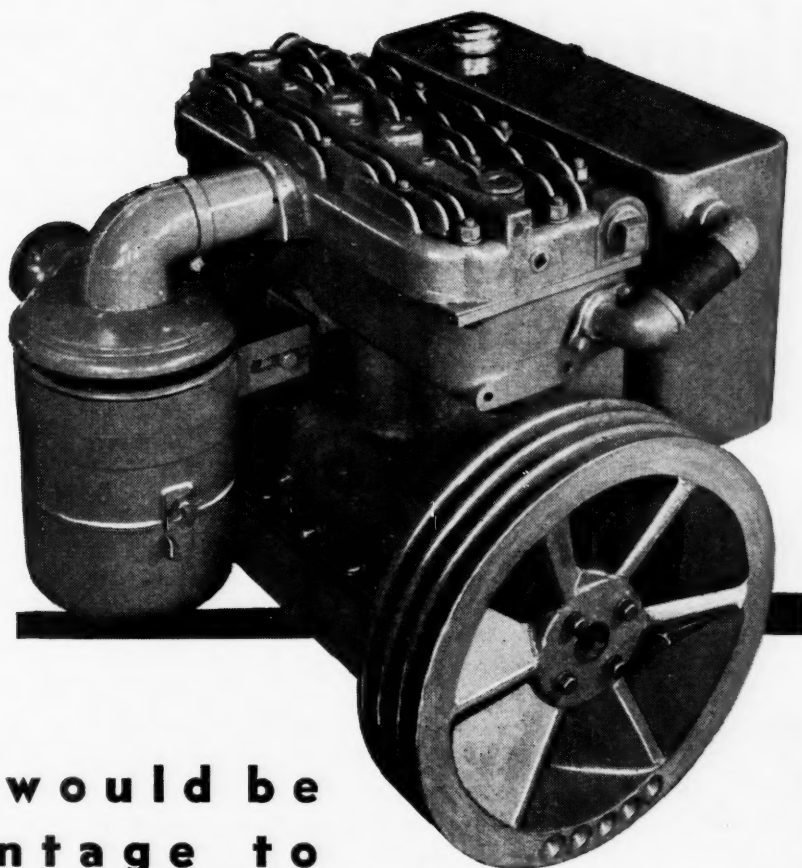
1115 Arlington Avenue

Pittsburgh 3, Pa.

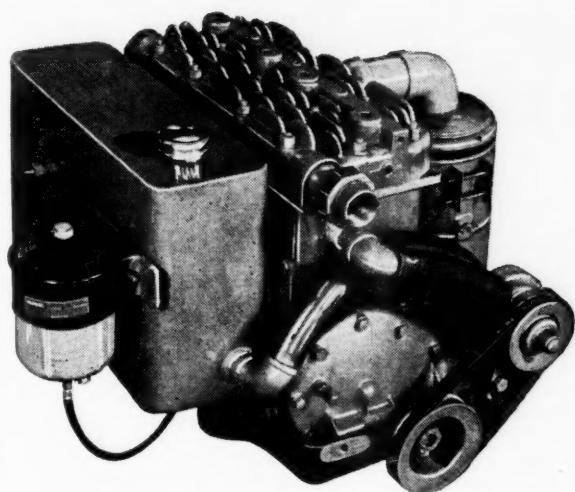


M8-F BOND

# "IF YOU PAID DOUBLE ITS PRESENT PRICE—



—it still would be  
an advantage to  
buy **CANTRELLS**"



*The illustrations above show both end and side views of the Cantrell compressor assembly used in each of the five Cantrell Compressor outfits designed for every coal mine requirement.*

It is important that coal mine officials know about Cantrell Air Compressors, not only because of their dependability but because of their low maintenance costs.

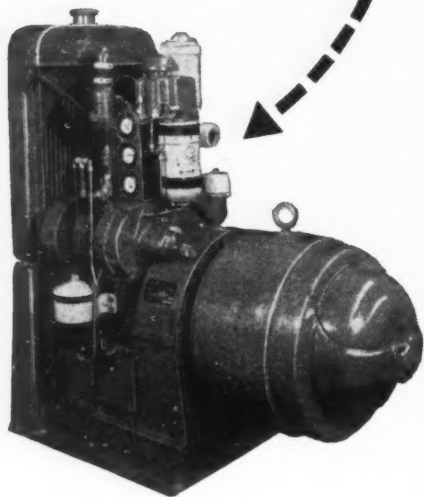
In air compressor service it's the compressor itself that takes the "punching". So, to assure you minimum maintenance cost Cantrell offers you a factory rebuilt compressor exchange plan, permitting replacement of compressor unit at small cost—about \$7.00 monthly, even if you had to change your unit annually.

This exchange plan applies to any Cantrell outfit, whether it be the self-traming or standard track type or rubber tired wheel type outfits.

## **Cantrell** **COMPRESSORS**

**IMPERIAL-CANTRELL MFG. CO., JELICO, TENNESSEE**

# Nothing Extra to Buy



**A Sheppard Generating Set  
is ready to produce power  
when it leaves the factory.  
All accessories are included  
as standard equipment . . .  
there's nothing extra to buy.**

Write for new 12 page booklet showing stand-  
ard equipment and other features of Sheppard  
Diesel Engines and Generating Sets.

**R. H. SHEPPARD COMPANY, INC.**  
11 Middle St., Hanover, Pa.

DIESEL'S THE POWER - **Sheppard's**  
THE DIESEL!

sonnel and structure of the top management of the company. Judson F. Stone has resigned as chairman of the board of directors, but will continue to serve as a director and as a member of the executive committee of the board. Fowler McCormick, formerly president, has been elected chairman of the board. John L. McCaffrey, formerly first vice president, has been elected president to succeed McCormick. W. E. Worth, formerly second vice president, and P. V. Moulder, formerly vice president in charge of the motor truck division, have been elected executive vice presidents. W. C. Schumacher, formerly sales manager of the motor truck division, has been appointed to succeed Moulder as the head of that division, with the title of general manager.

Joy Mfg. Co., Pittsburgh, has announced the purchase of the Breckenridge Machine Co., Cleveland, Ohio. The Breckenridge Co. specializes in high-grade machining of parts and also builds machine tools on order, according to the announcement, and for years Joy has bought increasing amounts of precision machining from them. H. W. Breckenridge and R. W. Breckenridge will assume management of the Breckenridge plant and business for Joy, which for the present will operate as the Breckenridge Division of Joy.

BURY COMPRESSOR Co., Erie, Pa., has elected B. C. O'Brien president and general manager. Prior to joining Bury, Mr. O'Brien was associated for a number of years with the Roots-Connersville Blower Corp. where he was vice president and sales manager.

FAIRBANKS, MORSE & Co., Chicago, has elected L. W. Stolte, associated with the company since 1928 and recently general credit manager, as secretary of the company to replace Fred C. Dierks, recently retired after service of 45 years.

COMBUSTION ENGINEERING Co., New York, has named Bertram J. Cross manager of its development and research department, succeeding the late Henry Kreisinger with whom he had been closely associated for over 25 years.

THERMOID Co., Trenton, N. J., has appointed Edward C. Hoefflich industrial sales promotion manager of its Thermoid Rubber division. Mr. Hoefflich was formerly connected with Ace Manufacturing Co., Philadelphia, as sales and advertising manager, and Henry Diston & Sons, Philadelphia, as manager of the steel specialties division.

RELiance ELECTRIC & ENGINEERING Co., Cleveland, Ohio, has named C. V. Gregory, formerly sales engineer, as district manager in Pittsburgh to succeed Bon J. Ballard, who becomes assistant to the sales vice president. L. P. Carr, sales engineer in Reliance's Chicago office prior to 2½ years in the U. S. Naval Reserve, has joined the Reliance staff in Pittsburgh.

McNALLY PITTSBURG MFG. CORP., Pittsburgh, Kan. has announced a recent agreement whereby McNally-Pittsburg coal-preparation products will be manufactured in Canada by the Vulcan Iron Works Ltd., Winnipeg, Man. as the sole licensee and co-manufacturer in Canada. Through the

## Compensation within 11 days after disaster STRIKES!

(Excerpt from ROANOKE TIMES,  
Roanoke, Va., April 30)

**CHRISTIANSBURG, April 29**—Survivors of the 12 victims of the Great Valley Anthracite mine explosion at McCoy April 18 received initial insurance payments aggregating in the neighborhood of \$2,600 each when they met with state compensation commission and insurance company representatives here today.

T. A. McNickle, branch manager of the Bituminous Casualty Corporation which held workmen's compensation insurance on the Great Valley operation, said he believed the payments made within 11 days of the disaster set a speed record for this part of the country.

Bituminous is proud of its record for rapid adjustment since it pioneered the underwriting of Workmen's Compensation insurance in coal mining areas over 28 years ago. Today Bituminous writes more Workmen's Compensation for coal mines than any other carrier.

ASSETS OVER \$14,000,000

**BITUMINOUS CASUALTY  
CORPORATION**  
ROCK ISLAND ILLINOIS

Over 28 Years of Service to  
the Industry.



## We Moved OUT the Move-up Problems

How many times a day must your shovel move up to a new digging position?

Whether it's one or a hundred, you'll save more than half the amount of time on every move up with a modern P&H electric shovel.

That's because P&H has eliminated all the old complexities by providing a separate heavy duty shovel type motor for propelling — completely independent of all hoisting and swinging motions.

With a P&H, you have no sliding gears to manipulate, no mechanical clutches to engage and disengage. You have only to flip the master propel switch and the machine is ready to move up, instantly. It's simpler and easier, of course. But the important advantage is the time saved to increase production — to cut tonnage costs.

P&H's independent propel motor is only one of many progressive ideas you'll find contributing to steadier,

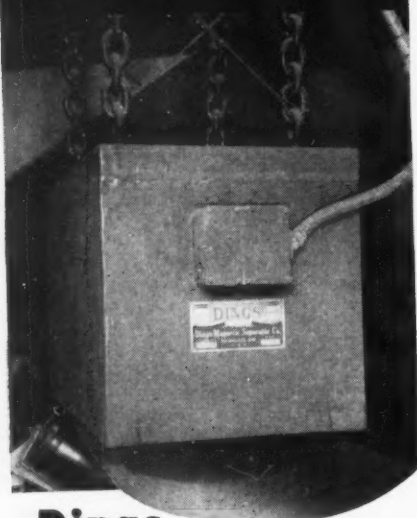
bigger production in all kinds of open pit operations. It is one example of P&H's 60-year experience in applying electrical power to the movement of heavy loads. Ask for complete information.



4540 W. National Ave. Milwaukee 14, Wis.

LEADING THE WAY IN ELECTRIC SHOVEL DEVELOPMENTS

## HEAVY DUTY IRON REMOVAL

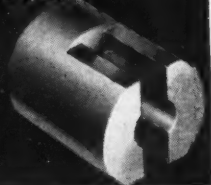


### Dings Rectangular Magnets

Put Dings "High Intensity" Rectangular Magnets over heavily-loaded conveyor belts. Tramp iron is snapped up out of the coal burden... positively protecting your equipment and your customers' stokers. Dings Rectangular Magnets put down a uniform, powerful magnetic field across the entire belt width... Dings design makes a magnet wider than the belt unnecessary... Get complete details on heavy-duty iron removal from Dings today.

### NEW! DINGS

*Magnetic  
Drill  
Extractor*



A powerful Alnico Magnetic Drill Extractor to save redrilling blast holes when drill rod or bits break off in the hole. Dings Extractors lift up 25 to 40 times their own weight... Easy to use... Can be carried in a pocket... Write for data sheet containing complete information.

**DINGS MAGNETIC SEPARATOR CO.**  
506 E. Smith Street, Milwaukee 7, Wisc.

# Dings

"HIGH INTENSITY"

new arrangement, all engineering, service and manufacturing resources of both companies are now available to Canadian coal operators.

DELAVAL STEAM TURBINE CO., Trenton, N. J., has appointed James P. Stewart special representative for centrifugal blowers and compressors. Mr. Stewart for many years was connected with the Elliott Co., Jeanette, Pa., and was recently assistant general manager of B-W Superchargers, Inc., Milwaukee.

INTERNATIONAL HARVESTER CO., Chicago, has named W. K. Perkins, former assistant manager of sales, as manager of sales for its motor truck division. L. W. Pierson has succeeded him as assistant manager of sales. R. R. McDonald has been appointed manager of the newly established motor truck branch at Salt Lake City.

AMERICAN BRAKE SHOE CO. has named J. F. Weller to a newly created post of sales assistant to the president. W. Frank Kelly has been appointed general superintendent of foundries of its American Manganese Steel division.

WARREN STEAM PUMP CO., INC., Warren, Mass., has appointed Jarvis Equipment Co., 795 East McMillan St., Cincinnati, Ohio as district agents in Kentucky and the southern sections of Ohio, Indiana and West Virginia.

ECONOMY PUMPS, INC., Hamilton, Ohio, has announced the purchase of the Klipfel Mfg. Co., makers of fluid flow equipment. J. H. Swan of the Klipfel company remains in an advisory capacity and as chairman of the board of Klipfel.

GENERAL ELECTRIC CO., Pittsfield, Mass. has named Harry K. Collins manager of its resin and insulation materials division. Mr. Collins was formerly manufacturing manager of the division in Schenectady.

UNITED ENGINEERS & CONSTRUCTORS INC., Philadelphia, has appointed Henry Martyn Chance, II, associated with the company since 1936, assistant to the president.

AMERICAN CHAIN & CABLE CO., INC., Bridgeport, Conn., has elected A. P. Hall a vice president. He will continue his present duties as general manager of sales, with headquarters in New York. A. C. Curran, associated with the company since 1914, has been appointed general purchasing agent with headquarters in Bridgeport.

CHICAGO PNEUMATIC TOOL CO., New York, has appointed Robert A. Rankin sales manager of its diesel engine division. Mr. Rankin, formerly assistant manager of the engine division, succeeds H. W. Buker, head of diesel engine sales for the last 20 years, who is retiring to his farm in Maryland, after 26-years service with the company.

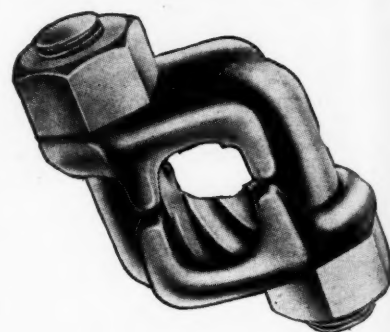
ROOTS-CONNERSVILLE BLOWER CORP., Connersville, Ind., has elected Robert H. Owens, with the company since 1925, vice president in charge of engineering and manufacturing.

R. G. LETOURNEAU, INC., Peoria, Ill., has appointed Stanley D. Means, formerly industrial sales manager, to the newly created

# PROTECT

BETTER, PREFORMED ROPE  
WITH BETTER

## "FIST-GRIP" CLIPS



Cross-section views (nuts tightened to same tension by torque-indicating wrench) show —



## 3 WAYS "FIST-GRIP" SAFETY CLIPS SAVE

**1. They Save Skill** by eliminating difficult, expensive splicing. Foolproof... can't be applied backward or upside down.

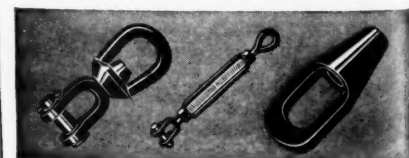
**2. They Save Metal.** Three "Fist-Grip" Safety Clips do work of 4 ordinary U-bolts. Improved bearing surfaces provide more friction. They save rope too because they don't crush or break it.

**3. They save time.** Easy and speedy to install. Fewer needed. No special wrenches. Laughlin "Fist-Grip" Safety Clips are ideal not only for preformed wire rope but ordinary wire rope as well. The only clips with drop-forged bolts, their "Fist-Grip" is as strong as rope itself. Distributed through mill, mine and oil field supply houses. For a complete catalog on Laughlin's wire rope and chain hardware, write Dept. 6, The Thomas Laughlin Co., Portland 6, Maine.

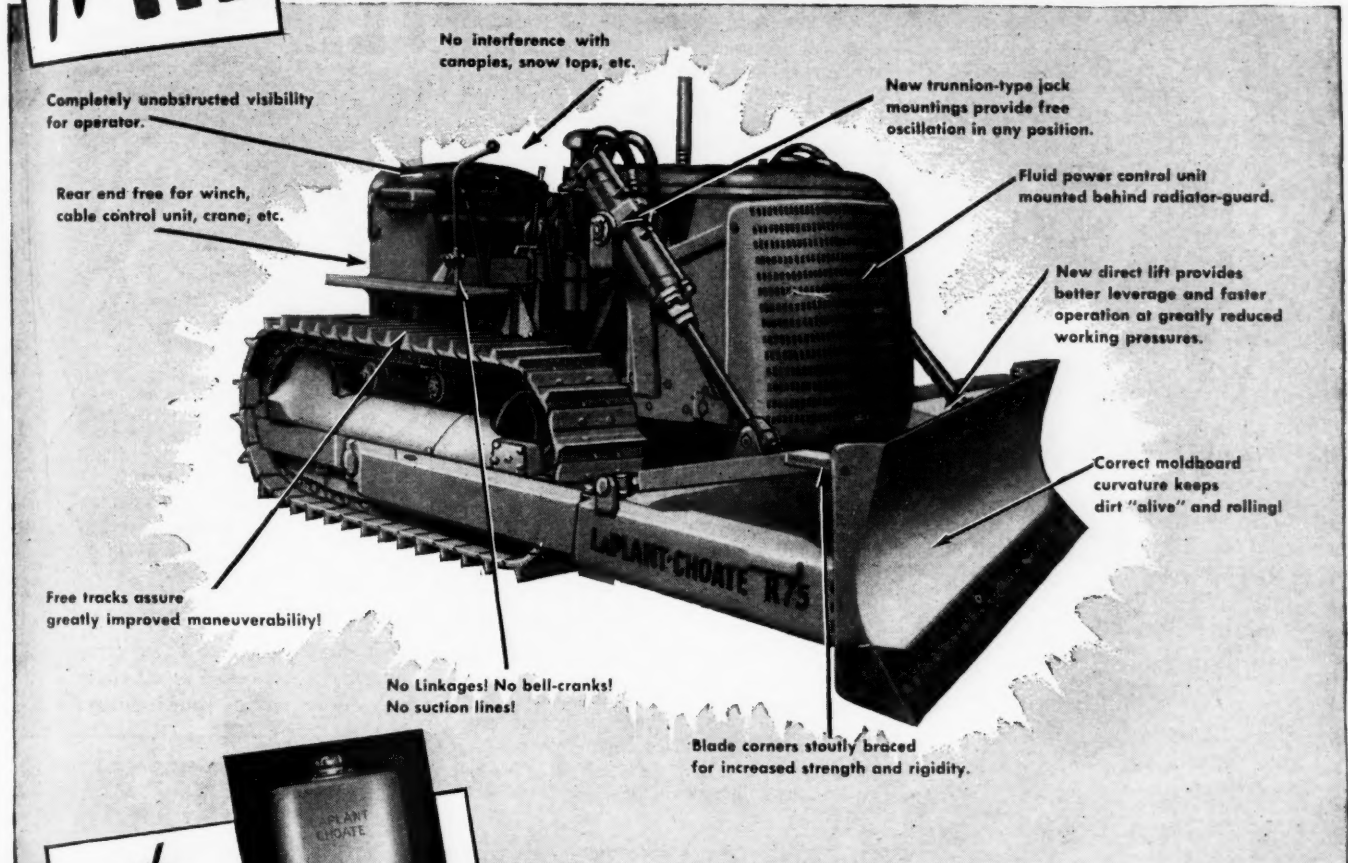
**LAUGHLIN**



THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



# **Now! ... a hydraulic dozer** with the speed and simplicity of a cable machine!



- Completely unobstructed visibility for operator.
- Rear end free for winch, cable control unit, crane, etc.
- Free tracks assure greatly improved maneuverability!
- No Linkages! No bell-cranks! No suction lines!
- No interference with canopies, snow tops, etc.
- New trunnion-type jack mountings provide free oscillation in any position.
- Fluid power control unit mounted behind radiator-guard.
- New direct lift provides better leverage and faster operation at greatly reduced working pressures.
- Correct moldboard curvature keeps dirt "alive" and rolling!
- Blade corners stoutly braced for increased strength and rigidity.



**PLUS**

## **LaPLANT-CHOATE'S FAMOUS "fluid power control"**

Pump, valve and oil reservoir are all combined into a single compact unit that mounts on the front of the tractor behind the radiator guard. This new "closed system" design completely eliminates long suction lines, reduces the hazard of leaks and assures greatly increased speed and efficiency. In addition, the entire unit is skillfully engineered and precision built for utmost simplicity, easy servicing, and long, trouble-free operation at lowest possible cost.

Here at last is a dozer that gives you all the advantages of hydraulic operation—powerful "down pressure" and positive blade control—*plus* new dependability, simplicity and fast blade action that will compare favorably with any cable dozer you've ever used. Developed for war and thoroughly proved under tough combat conditions, this new LaPlant-Choate machine has already been hailed as the greatest dozer advancement in over a decade. Moreover, it can be obtained with either straight or angling blade for "Caterpillar" D-8 and D-7 tractors, while other LaPlant-Choate hydraulic models are available for the smaller D-6, D-4 and D-2 sizes. See your LaPlant-Choate distributor today for complete details. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Avenue, Oakland, Calif.

# **LaPLANT - CHOATE** *Job-Proved Equipment...* for Lowest Possible Cost in Moving Earth

**Fresh Air**

**ALL ABOUT**

*Be Sure*

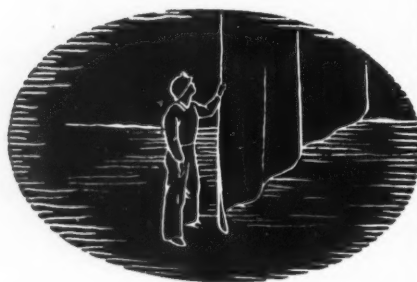
**OF A PLENTIFUL SUPPLY OF FRESH AIR TO YOUR MEN AT ALL TIMES—**

**USE ABC JUTE BRATTICE CLOTH**



ABC Jute Brattice Cloth is specially treated to resist corrosive conditions and to reduce air friction—three grades from which to choose to properly fill your needs, give **POSITIVE ASSURANCE** against such destructive forces as flame and fungi. Make sure your brattice cloth is flame resistive, closely woven, high in tensile strength—so that you will get the longest use possible from your brattice lines—specify ABC.

Write for the facts on this time-proved brattice cloth.



★

**AMERICAN**

**BRATTICE CLOTH CORP.**

**WARSAW, INDIANA**

position of domestic sales manager, with responsibility for all sales in the United States, Canada, Hawaii, and Alaska.

**VULCAN IRON WORKS**, Wilkes-Barre, Pa., has announced the appointment of Thomas H. Fawcett, associated with the Baldwin Locomotive Works for nearly 30 years, as sales engineer for its locomotive division.

**TIMKEN ROLLER BEARING CO.**, Canton, Ohio, has announced the return of six naval veterans to its industrial division as follows: R. G. Harmon, field engineering, Chicago; D. G. Gibson, field engineering, Cincinnati; S. T. Salvage, assistant district manager, industrial division, Cleveland; R. L. Williams, field engineer, Cleveland; F. J. Hartshorne, field engineer, Milwaukee; and L. M. Meyer, field engineer, Pittsburgh.

**WORTHINGTON PUMP & MACHINERY CORP.**, Harrison, N. J. has named George H. Allen, recently released from the Army Air Forces as a lieutenant colonel after 42 months of service, as sales promotion specialist for Blue Brute rock drills.

**PORTABLE PRODUCTS CORP.**, Pittsburgh, Pa., has named Jasper Van Opynen, Jr., vice president in charge of manufacturing operations for all its divisions.

**LINK-BELT CO.**, Chicago, has announced the opening of three new sales offices as follows: 1608 Fifth Ave., Moline, Ill., with M. J. Parykaza, district sales engineer, in charge; 730 Temple Bar Bldg., Main & Court Sts., Cincinnati 2, Ohio, with L. R. Clark, district sales engineer, in charge; and 823 Comer Bldg., 2100 Second Ave., N., Birmingham 3, Ala., with C. C. Wiley, district sales engineer, in charge.

### Trade Literature

**BELT-CONVEYOR IDLERS**—Chain Belt Co., 1600 West Bruce St., Milwaukee 4, Wis. Bulletin No. 463 describes the complete line of Rex belt-conveyor idlers and includes photographs, tables, charts, diagrams and cutaway views used profusely to illustrate the items. Proper selection of idlers, details of construction, special-application idlers, and belt-conveyor accessories are covered.

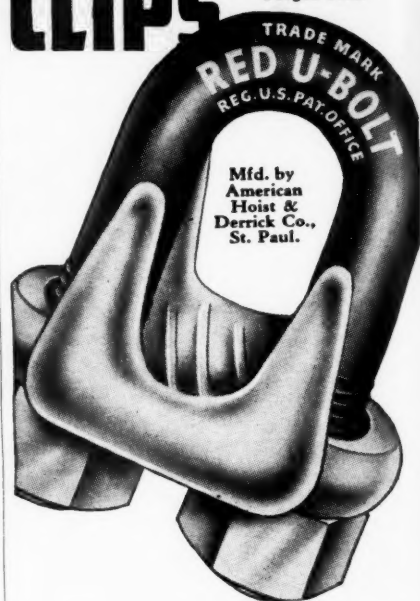
**RAIL-CROPPING MACHINE**—Air Reduction Sales Co., 60 East 42d St., New York 17, N. Y. Folder describes the new Air Reduction rail-cropping machine and its simplified operation for cropping relay rails. Complete operating instructions are included as well as repair- and replacement-parts lists.

**BLOWERS** — Roots-Connorsville Blower Corp., Connorsville, Ind. Bulletin 22-23-B-12 covering rotary positive blowers details the many applications for this type of blower which is built in a wide range of sizes, from 5 to 50,000 c.f.m., at pressures up to 30 lb., and for vacuums up to 28-in. hg. The booklet includes characteristic curves, cross-sections, and exploded views to show the operating principle and construction features.

**INDUSTRIAL LOCOMOTIVES** — Brookville Locomotive Works, Brookville, Pa. Booklet

## in ALL SIZES! CROSBY CLIPS

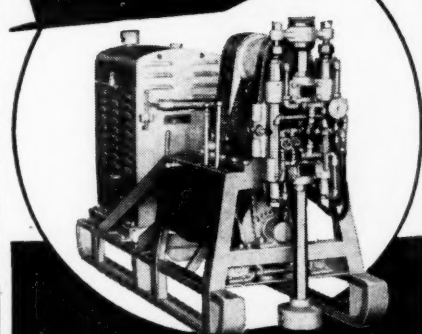
Galvanized Drop  
Forged Steel



Sizes from 1/8" up to 4" for every application stocked at all times by dealers serving your industry.

## Diamond Core Drilling

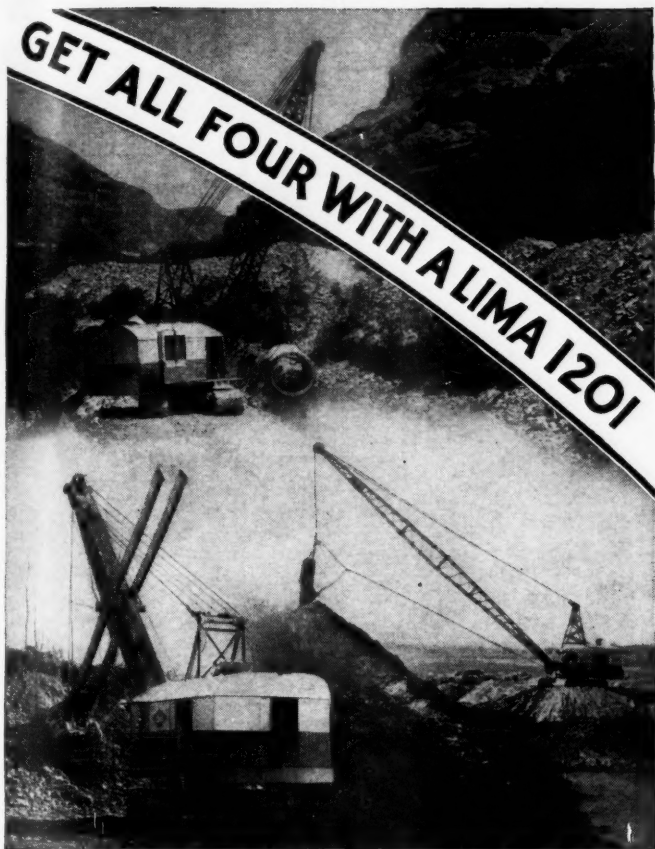
CONTRACTORS



Testing mineral properties with our light gasoline drills. **SATISFACTORY COAL CORES GUARANTEED.** Ground solidification by our pre-pressure grouting method for shafts. Wetmine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

**MOTT CORE DRILLING CO.**  
HUNTINGTON • WEST VIRGINIA

**GET ALL FOUR WITH A LIMA 1201**



**1 ANTI-FRICTION BEARINGS THROUGHOUT**

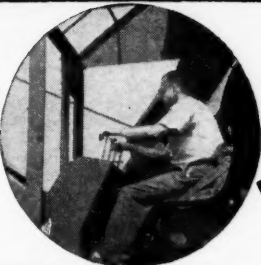
**2 HOIST, SWING TRAVEL and BOOM UP OR DOWN AT THE SAME TIME**

**3 BIG WIDE DRUMS . . .**

**4 "PRECISION" AIR CONTROL . .**

**The more precise the MACHINE the better the PERFORMANCE**

**EASY TO OPERATE**



**LESS FATIGUE**



The LIMA Type 1201 is designed, engineered and built for heavy duty construction—for the job that demands more than the ordinary. As a standard shovel it is equipped with a 3½ cubic yard dipper, 32' 6" boom and 22' 0" dipper handle. For high lift work a 42' 0" boom, 32' 0" dipper handle and 2½ cubic yard dipper can be furnished. As a crane it has a lifting capacity of 65 tons. Dragline capacities vary, depending upon the nature of the work. Whatever the job, whether it be tough rock digging, working as a dragline, in wet swampy ground or crane work where heavy lifts must be made with utmost precision, you'll find that the LIMA Type 1201 will fit into your plans exactly. Every day, more and more users of excavating machinery are turning to LIMA for the most in excavator design.

#### **LIMA LOCOMOTIVE WORKS, INCORPORATED**

Shovel and Crane Division

LIMA, OHIO, U.S.A.

NEW YORK, N. Y.  
NEWARK, N. J.  
LOS ANGELES, CALIF.

ST. LOUIS, MO.  
MINNEAPOLIS, MINN.  
SAN FRANCISCO, CALIF.  
SEATTLE, WASH.

DALLAS, TEXAS  
MEMPHIS, TENN.  
PORTLAND, ORE.  
SPokane, WASH.

**SHOVELS ¾ YARD TO 5 YARDS**

**DRAGLINES -- VARIABLE**

**CRANES 13 TONS TO 100 TONS**

## TAKE YOUR CHOICE

### from the 2 types of **DUFF-NORTON** MINE ROOF JACKS



#### **STANDARD** **DUFF-NORTON** **MINE ROOF JACK**

Strong, safe, quick operating; made in two capacities—8 and 16 tons; heights from 30 to 72 inches, with a raise of 17 inches. Available with variety of head and handle styles.

#### **TAILOR-MADE**

#### **DUFF-NORTON** **MINE ROOF** **JACK FITTINGS**

You buy only the base and screw fittings, cutting your own 2 inch pipe to the height you need. Fittings are quickly and easily attached to pipe columns. Can be used over and over. Two capacities—8 and 16 tons.



**Write for bulletins on both types of Duff-Norton Mine Roof Jacks.**

**THE DUFF-NORTON**  
**MANUFACTURING CO.**  
PITTSBURGH, PA.

Canadian Plant: COATICOOK, QUE. There is a Distributor Near You

No. 1-100 illustrates construction and application details of gasoline and diesel-powered industrial locomotives.

**CONSTRUCTION INSULATION**—Pittsburgh Corning Corp., 632 Duquesne Way, Pittsburgh 22, Pa. Individual folders describe in detail application of Foamglas insulation for roofs, floors, walls and tanks.

**PUMPS**—Economy Pumps, Inc., Hamilton, Ohio. Bulletin No. C-945 details horizontal split-case, multi-stage, high-pressure centrifugal pumps, which can be used with motor, steam-turbine or engine drives. Applications include high-pressure boiler feeding, high-pressure water supply and hydraulic elevator service, and in general, wherever quantities of liquids are to be handled from 75 to 500 lb. per square inch and capacities from 75 to 400 g.p.m.

**ELECTRODES**—Metal & Thermit Corp., 120 Broadway, New York 5, N. Y. Bulletin describes Type HTS electrode designed to prevent underbead cracking in the welding of "difficult-to-weld" steels such high-sulphur free-machining steels, high-carbon steels, cold-rolled steels and cast iron. Tables give full data on the physical properties and chemical analysis of the Type HTS deposit, and information covering the effect of stress relieving and the comparative deposition characteristics of Type HTS and other mild steel electrodes is included.

**TRACTORS**—Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis. Catalog No. MS-290A emphasizes numerous features of the new Type HD-7 diesel tractor and outlines facts about the General Motors 2-cycle engine, the unit injector, transmission construction, and the popular "Positive" sealed truck wheels. Specifications on the HD-7 include its 60-drawbar horsepower, five speed ranges, engine dimensions, fuel capacities, shipping weights and track design.

**HYDRAULIC JACKS**—Joyce-Cridland Co., Dayton 3, Ohio. Bulletin 190-J describes Joyce Liftmaster Nu-Hydro Jacks, a new line of hydraulic jacks built of drop forged steel.

**MOBILE MACHINE SHOP**—Davey Compressor Co., Kent, Ohio. Booklet illustrates and describes a machine shop mounted on standard trucks, which is said to include all equipment ordinarily assembled only in large central repair depots. Basic power units are a 60-c.f.m. Davey compressor, 300-amp. welding generator, and 5-kw. power generator.

**JACKS**—Buda Co., Harvey, Ill. Bulletin No. 1040D describes and illustrates the company's full line of ratchet, screw and hydraulic jacks, and contains complete details of dimensions and performance.

**STATIC-ELECTRICITY CONTROL**—Acheson Colloids Corp., Port Huron, Mich. Technical bulletin No. 140.1 on the control of static electricity developed on drives and conveyor belts describes a technique involving the application of colloidal graphite (dispersed in quick-drying solvents and diluted with carbon tetrachloride) to the under or pulley side of the belts—which treatment results in a tenacious and electrically con-

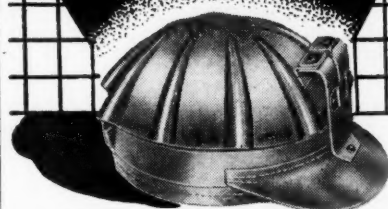
**REST where it is COOL**



**AIR - CONDITIONED**

### **PORTABLE** **"Cool Cap"** and **Safety Equipment**

**HELP AVOID**  
**MANPOWER LOSS**



Write for catalog on our complete line of Safety Equipment, including Safety Hats, Miners' Belts, Safety Shoes and Boots, Powder Bags, Haulage Safety Devices, Goggles and Respirators.

**Safety Division**

**PORTABLE PRODUCTS**  
**CORPORATION**

424 Blvd. of Allies, Pittsburgh, 19, Pa.

SPECIFICATIONS ALONE DO NOT MAKE A WORM GEAR

*Controlled  
Atmosphere  
Hardening*

***INCREASES Life of DE LAVAL Gears***

The extremely long life of De Laval Worm and Gear sets is due, in part, to the heat treatment to which the worms are subjected. Made from carefully selected alloy steel, De Laval worms are case hardened in the most modern, controlled atmosphere, forced convection, electric furnaces under careful metallurgical inspection and control. The heat treatment process employed provides a hard, uniform case and correct core structure of high tensile strength, free from internal stresses.

WG-2



WORM GEAR DIVISION

**DE LAVAL**

STEAM TURBINE COMPANY · TRENTON 2, NEW JERSEY



ductive film of graphite which continuously "bleeds" static electricity to ground. The static charges which produce sparks on untreated belts are the result of (1) high-speed flexing of the belts, (2) slippage on pulleys, and (3) friction between the belt and air.

**FLAME HARDENING**—Air Reduction Sales Co., 60 East 42 St., New York 17, N. Y. Catalog No. 90 describing design and use of Airco flame hardening apparatus includes items varying from simple water-cooled torches and tips for hardening small parts to complete apparatus for use on large jobs.

Equipment for gear hardening and hardening of both internal and external rounds, as well as for flat-surface hardening, and a variety of manifold, regulators, valves and seals, are described and illustrated.

**WIRE & CABLE**—Simplex Wire & Cable Co., Cambridge, Mass. Data sheet No. 115 describes Anhydroprene wire and cable, and lists applications and uses of the neoprene-jacketed Anhydrex insulated wire and cable. A catalog describing Simplex service-entrance cables is also available from the manufacturer.

**CONICAL SCRUBBER**—Hardinge Co., Inc., York, Pa. Bulletin No. 37-A covers in detail applications of the Hardinge conical scrubber, its principles of operation, capacity and complete specifications of the seven models built.

**ELECTRICAL-CONTROL EQUIPMENT**—Ohio Brass Co., Mansfield, Ohio. Folder illustrates wide range of safety and control equipment available for mine electrical systems.

**BUILDING-MAINTENANCE MATERIALS**—Stonhard Co., 401 North Broad St., Philadelphia 8, Pa. Folder details and illustrates use of materials for resurfacing of roofs, floors, underground waterways, sumps, shafts, etc.

**AIR RECEIVERS**—Scaife Co., Oakmont, Pa. Bulletin No. 320 details complete size and pressure data on Scaife air receivers for air-compressor service. Horizontal and vertical air receivers of both A.S.M.E. and non-code construction are listed in convenient tabular form. Data include capacities, working pressures, and dimensions.

**PIPE-FITTING TOOLS**—Beaver Pipe Tools, Inc., Warren, Ohio. Folder lists, with illustration, prices and details, hand and power equipment for cutting, reaming and threading pipe, etc.

**CONCRETE MIXER**—Kwik-Mix Co., Port Washington, Wis. Catalog illustrates outstanding features of the new Kwik-Mix 11-S Dandie concrete mixer, with complete dimensions and condensed specifications.

**V-BELTS**—Multiple V-Belt Drive Assoc., 22 West Monroe St., Chicago 3, Ill. Booklet, "How The Dominant Drive Speeds Production, Reduces Costs," is written for laymen and presents the results of multiple-V-belt-drive engineering features in terms of operating advantages to drive users. The booklet is designed to be of special value to executives and foremen responsible for efficient and economical plant operation.

**STEEL PILING**—Caine Steel Co., 1820 North Central Ave., Chicago 39, Ill. Catalog describes Cor-Plate steel piling used for sewers, retaining walls, dams, flood-protection and soil-erosion projects. Diagrams, tables, dimensions and weights assist the user to figure the requirements of a piling job, select the amount needed, and estimate the cost.

**WATER-COLUMN TRY-COCKS**—Yarnall-Waring Co., Chestnut Hill, Philadelphia 18, Pa. Bulletin WG-1815 details the company's line of water-column try-cocks for boiler-room use.

**EARTH DRILLS**—Buda Co., Harvey, Ill. Bulletin No. 1237 describes and illustrates Buda's commercial earth drills.

**FOUNDRY MACHINERY**—Robins Conveyors, Inc., Passaic, N. J. Bulletin No. 124-F describes and illustrates the Robins Portable Floatex Shakeout equipped with automatic flask loader, a unit which lifts flasks off the foundry floor, deposits them on the receiving table, turns them upside-down on the Floatex deck, shakes out the sand and discharges the castings—all in one quick series of operations.

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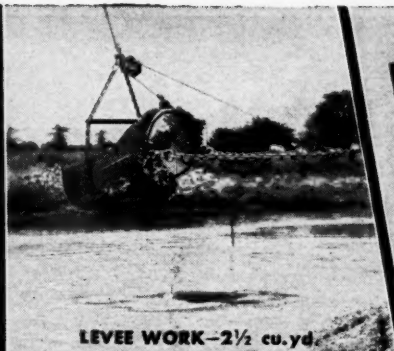
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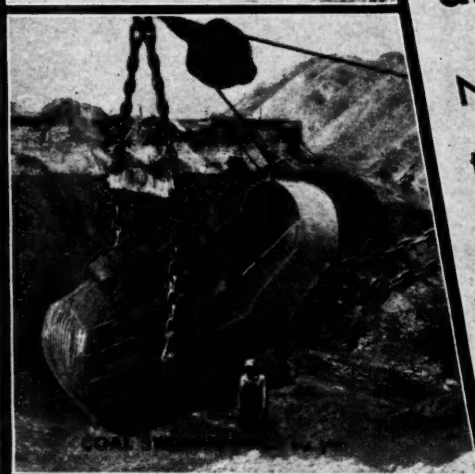
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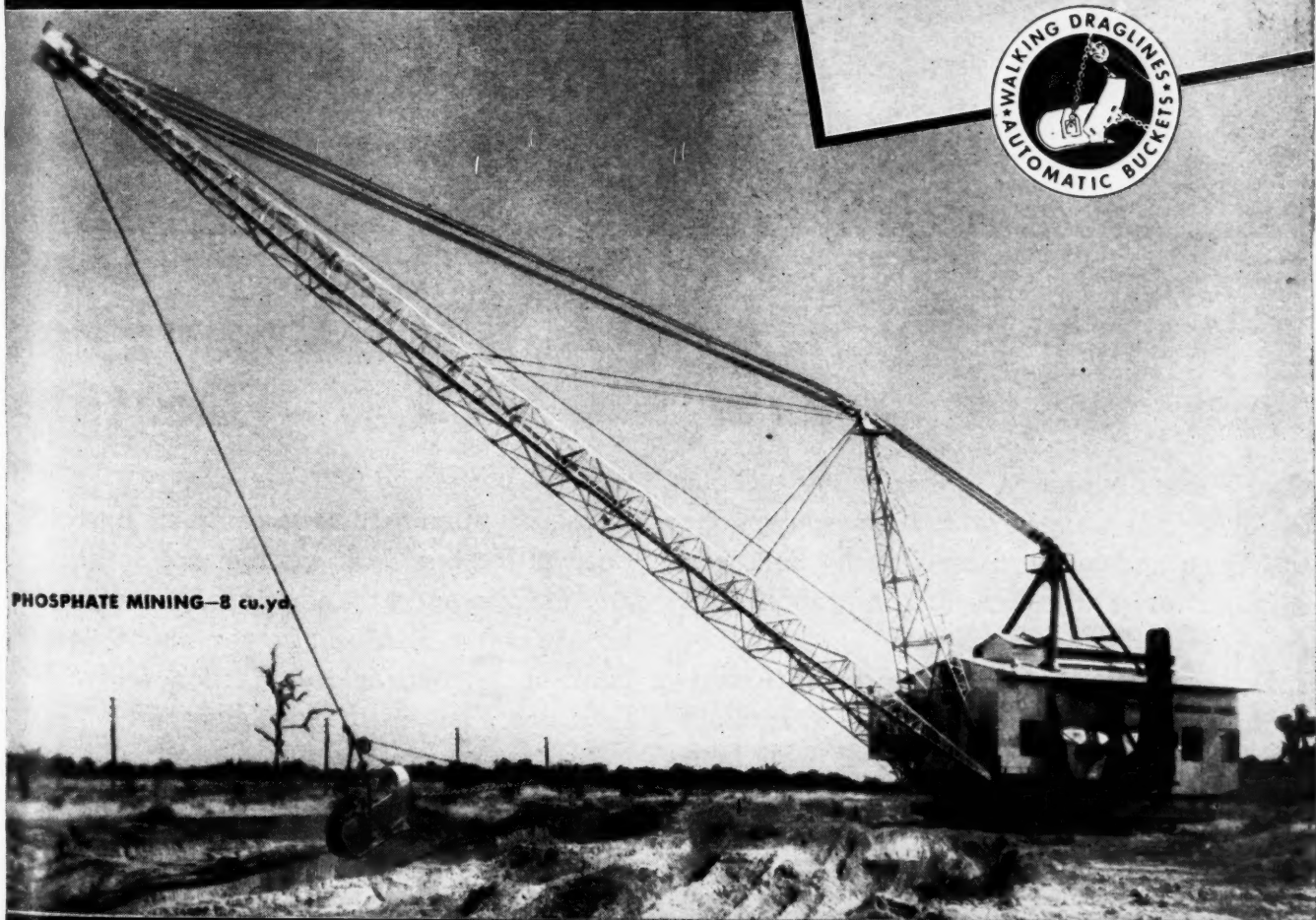


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Coal Mines depend on rubber conveyor belts to deliver big tonnage, and when you specify **QUAKER** and install these Quality Belts you can look forward to their handling thousands and thousands of tons of coal.

Quaker Belts are manufactured of American-made rubber for the covers and friction; carcass is of high grade duck and turned out under the supervision of highly trained tech-

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*"If there is a way to get it done—Quaker will do it"*

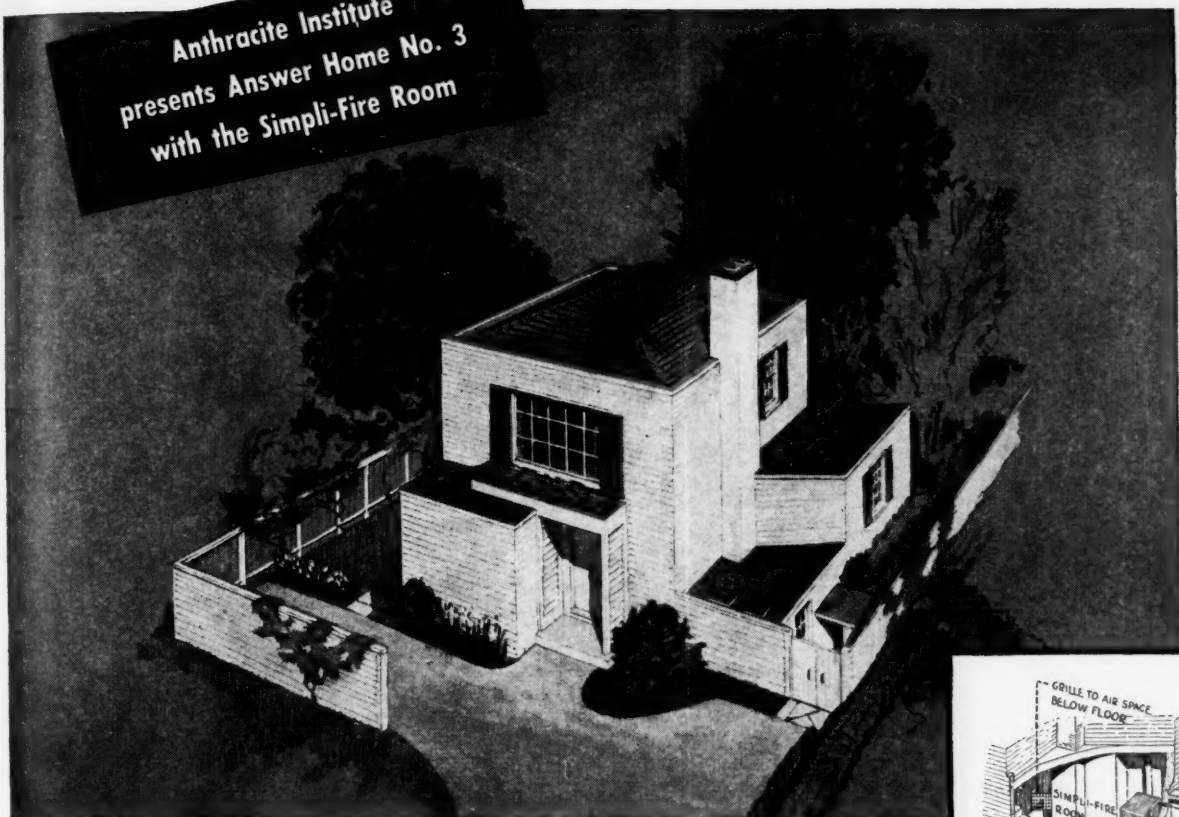
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Anthracite Institute  
presents Answer Home No. 3  
with the Simpli-Fire Room



## For Families Who Like to Sleep Upstairs

Anthracite Simpli-Fire Room provides more house, more heat, for less money

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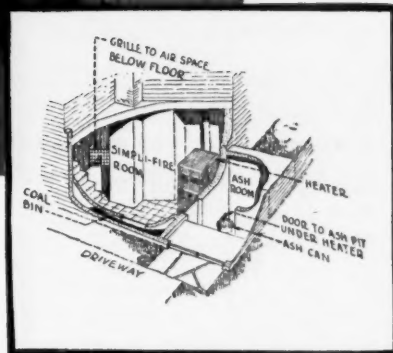
To the anthracite dealer, this is a development of greatest importance.

In the first place, it helps cut building costs, thus creating business for architect and builder, uniting coal and building professions.

Second, the Simpli-Fire Room makes anthracite easier to use, more desirable as a fuel . . . helps hold old markets, makes new life-long friends.

Here is anthracite in a brand-new package, a package with plenty of honest-to-goodness F. A. (Fuel Appeal).

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Other features which contribute to smooth, efficient power transmission in Farrel speed reducers include rigid and accurately ground shafts properly mounted in roller bearings, and heavy section cases that hold rotating elements in precise alignment.

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FB-327

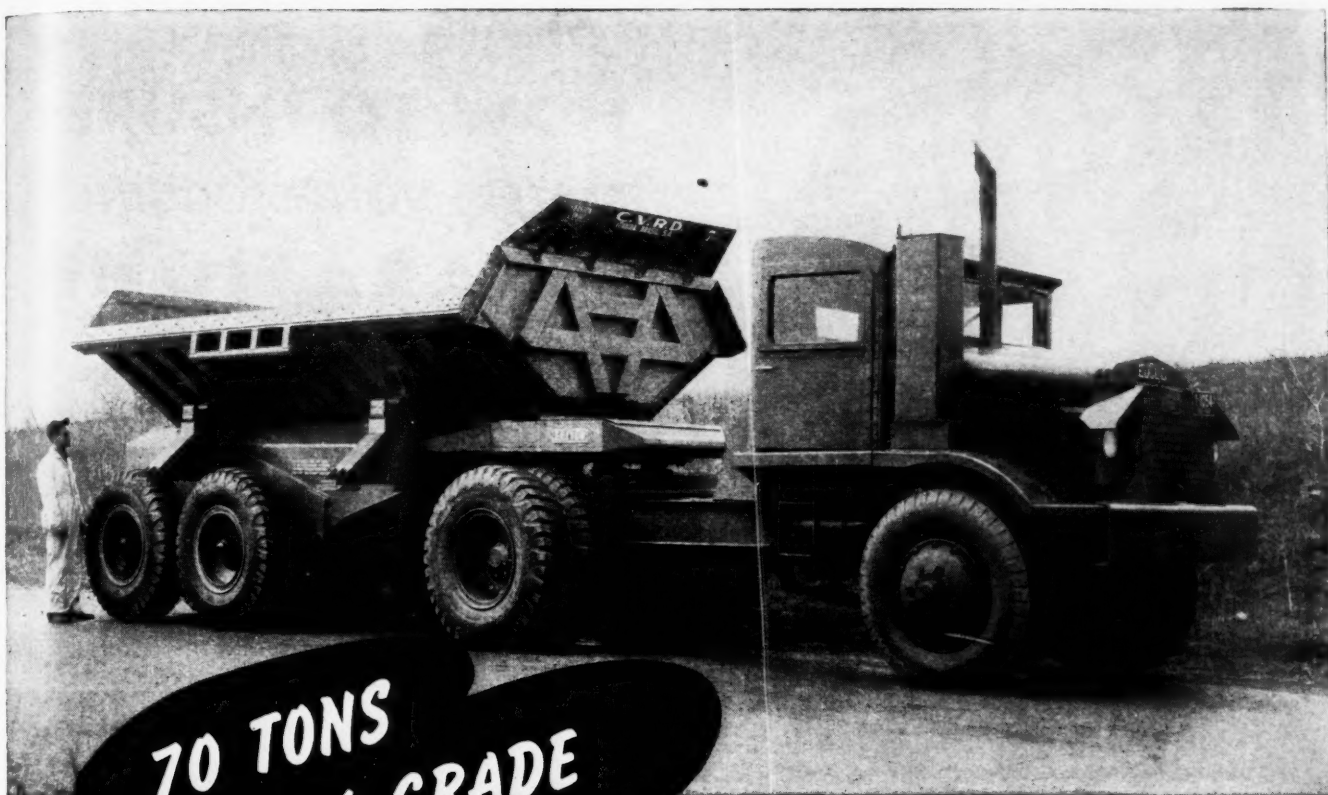
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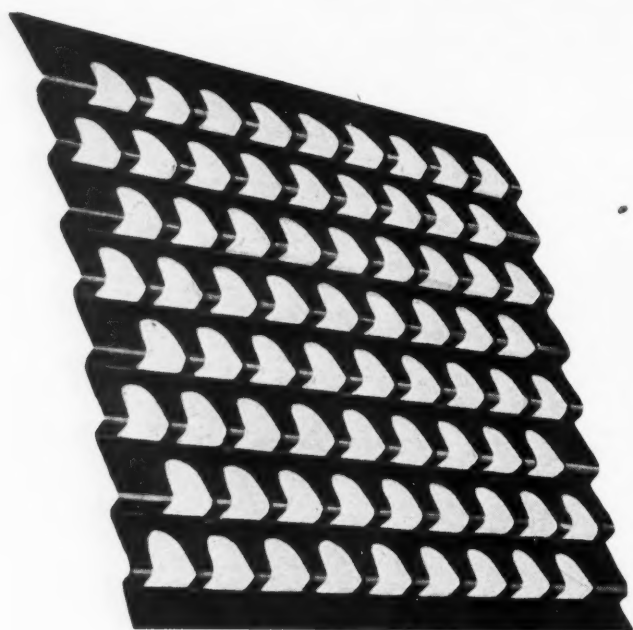
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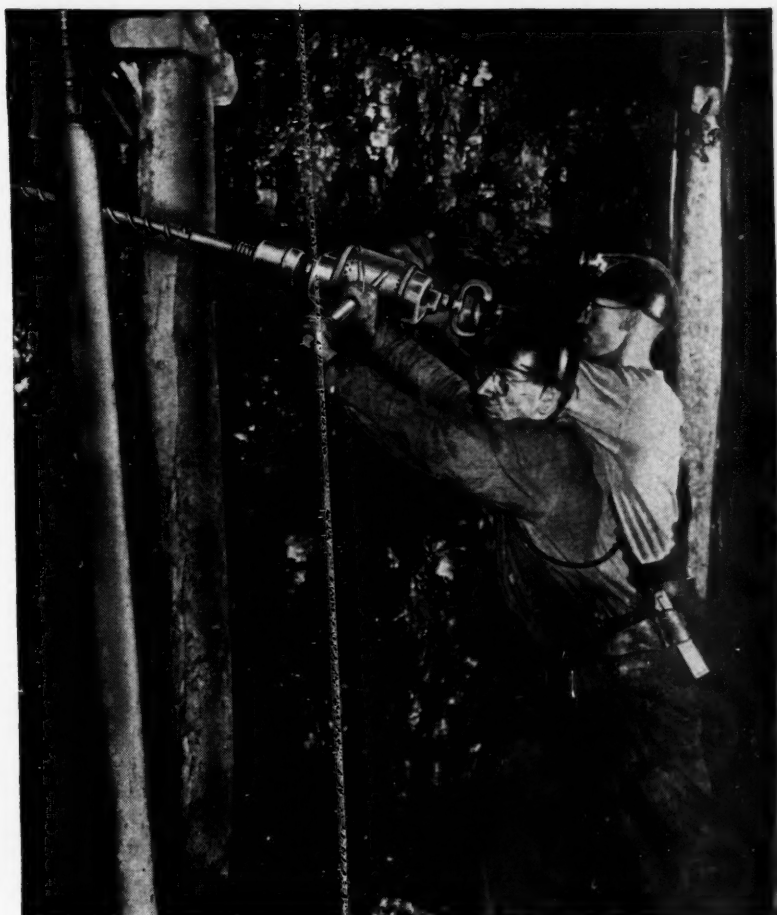


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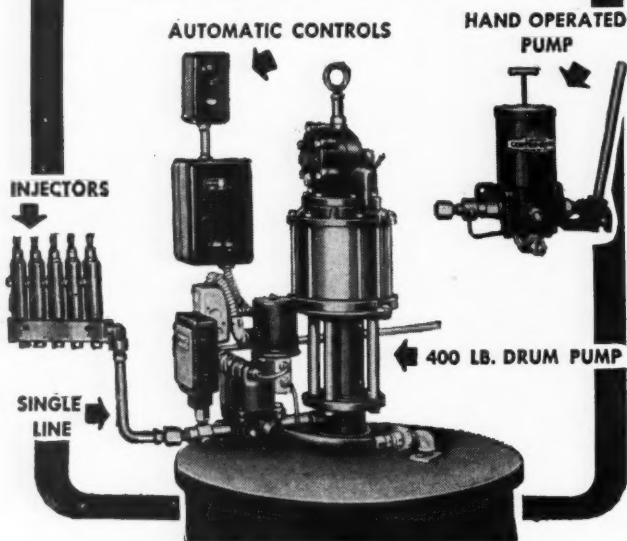
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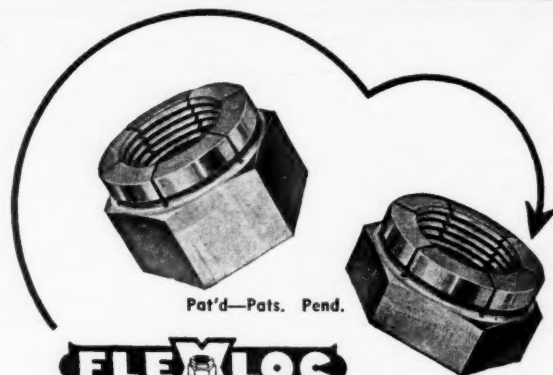
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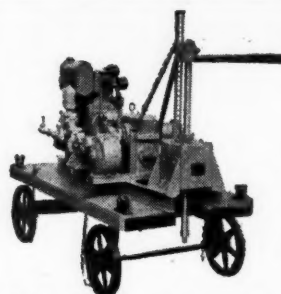
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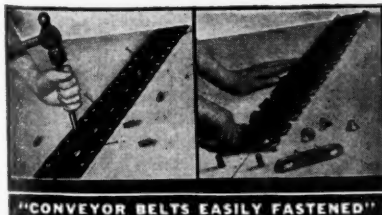
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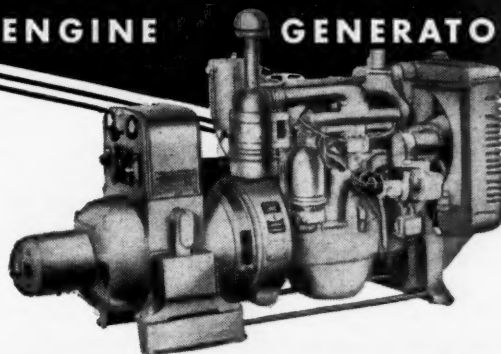
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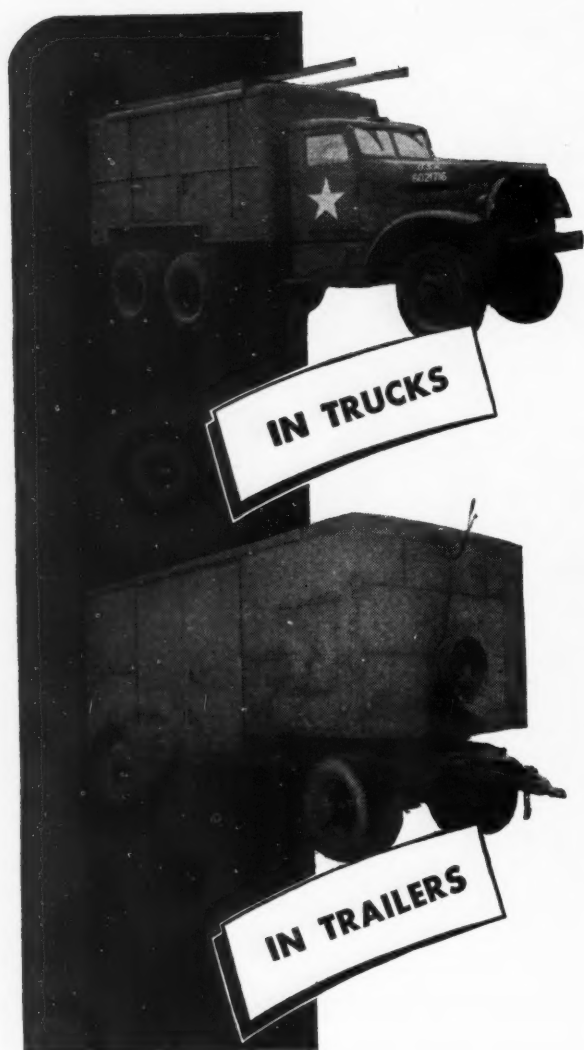


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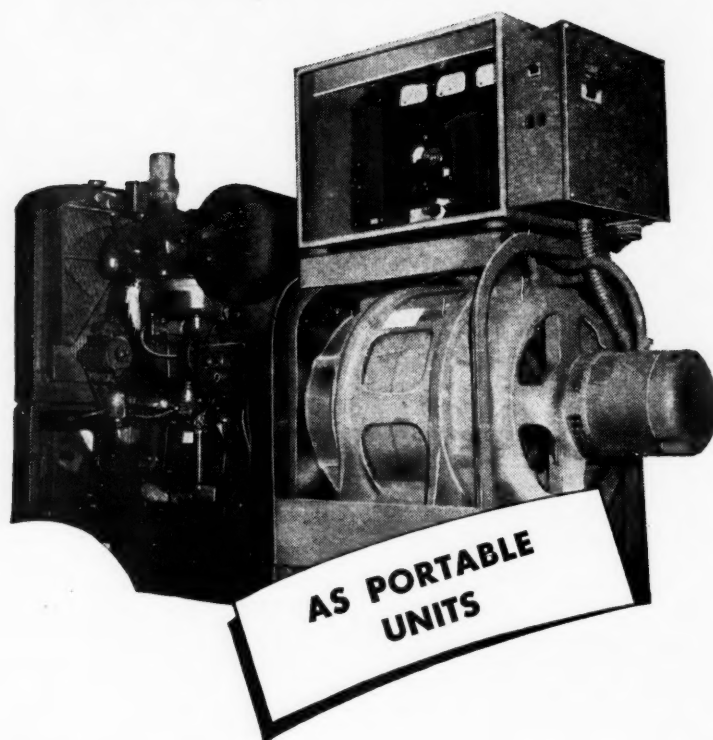
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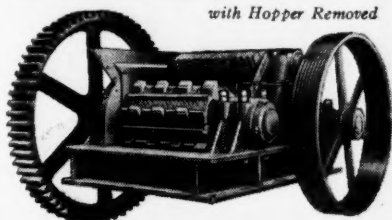
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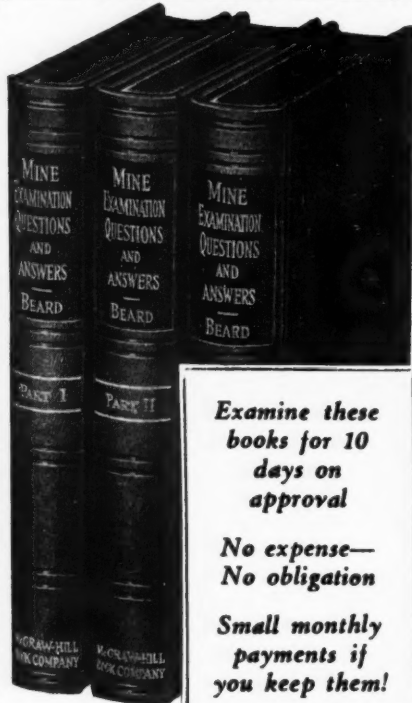
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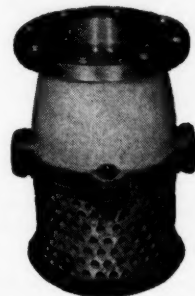
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36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
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12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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	35 "	10.50
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1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE  
All Prices—Net—F.O.B. New York

# CARLYLE RUBBER CO., INC.

62-66 PARK PLACE

NEW YORK, N. Y.

## FLOOR PLATE

Jal-tread, Diamond tread, etc.

Most all sizes and thicknesses  
in stock.

## GLAZER STEEL CORPORATION

610 Chamberlain St., Knoxville, Tenn.  
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## LATHE

30" x 6' centers BRADFORD Lathe, cone  
drive, back geared, Schultheis A.C.  
M.D. with motor, 6" raising blocks,  
standard equipment, Price \$1650.00

## CINCINNATI MACHINERY & SUPPLY CO.

218 E. Second St., Cincinnati 2, Ohio

## FOR SALE

### HOISTS

1—Ottumwa Electric hoist, single rigid-cylinder-conical drum, with automatic control. Weight of cage 7000#, weight of car 2500#, weight of coal 6000#, lift 310', diameter of rope 1 1/4". Diameter of drum 60"x84". Brake, 84" diameter, 8" face, post type, oil operated. Drum shaft bearings 10"x20". Hoist is equipped with single reduction gears 19 and 229 teeth, 2 1/2 D.P. 11" face. The drum has five grooves on the 60" diameter, 11 grooves up the cone, 4 grooves on the 84" diameter. The drum has a rope capacity of 326 feet plus three dead turns. The hoist is equipped with a 200 HP motor.

1—Ottumwa Iron Works single drum hoist. Width of drum 28", height of flange 5", diameter of drum 39", teeth in pinion gear 16, teeth in drum gear 86. Connected by flexible coupling to Ottumwa Iron Works speed reducer, size SF-11, #R-220 which in turn is connected by flexible coupling to a 60 HP General Electric slip ring motor model #93E200 GI type MTC 5536, form BL. 220/440 volts, 3 phase, 60 cycle, 900 rpm. #5282160. Complete with reversible controller and resistance.

### MINING MACHINES

3—Goodman Longwall mining machines, DC. 36" or 42" gauge.

6—Jeffrey 35A Shortwall mining machines, 50 HP motors, 250 volts, DC. 6' cutter bars, 36" or 42" gauge.

2—Sullivan CH-11 Shearing Machines, 250 volts, DC. 7 ft. cutter bars, 36" or 42" gauge.

1—Sullivan CH-11 Shearing machine, AC. 220 volts, 3 ph. 60 cy. 7 ft. cutter bars, 36" or 42" gauge.

1—Sullivan CE-7 Shortwall mining machine, AC, 220 volts, 3 ph. 60 cy. tip-turn truck, 7 ft. cutter bar, 36" or 42" gauge.

2—Sullivan Longwall mining machines, AC, #2991, #7061.

1—Sullivan CR3 Shortwall Cutting Machine 250 volts DC. Late style rope type machine complete with electric cable and reel.

2—Sullivan CLE5 Longwall mining machines, AC, 220 volts, 4 ft. cutter bars.

### LOCOMOTIVES

3—Goodman 5 ton locomotives, type W1-2A5, 36" or 42" gauge. One is complete with electric reel.

2—Goodman 6 ton ball bearing locomotives, type 3314T, 36" or 42" gauge.

1—6 ton Goodman locomotive, type 13314T, 250 volts, 4 1/2" gauge, ball bearing motors.

1—Goodman 4 ton locomotive, type 76A04T, 28" gauge.

1—Goodman 4 ton locomotive, type 75A04T, 28" gauge.

### STEEL TIPPLES

1—Tippie and shaker constructed by Allen and Garcia Company. Capacity 3000 tons daily. Have new and second hand rails and track accessories.

### COAL TREATMENT PLANT

1—Viking Hot Vapor Dust Control Unit. Capacity 75 tons per hour equipped with CP 200-20 pump. Has an oil tank of approximately 320 gallons capacity.

### MOTOR GENERATOR SET

1—50 KW General Electric motor generator set, type RC15, form A, 250/275 volts, direct connected to 75 HP. General Electric, AC, motor, 440 volts, 1165 rpm.

### DUCKBILL

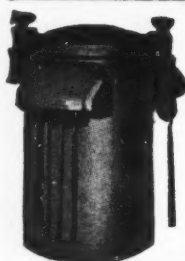
1—Goodman New Type, DC, type G20 Duckbill complete with pans.

**We are distributors for John A. Roebling Sons Company wire rope and fittings.**

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CANTON, ILLINOIS

## —TRANSFORMERS—



### TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign all Makes and Sizes  
**ALL TRANSFORMERS GUARANTEED FOR ONE YEAR**  
Write for Catalog No. 135-F

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"AMERICA'S USED TRANSFORMER CLEARING HOUSE"  
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Some Steam Engines and Boilers available only slightly above the metal price

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WAYNE, WOOD COUNTY, OHIO Near Toledo

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New & Reconditioned

**ALL SIZES for ALL PURPOSES**  
Cut and Threaded to Your Specifications  
**VALVES AND FITTINGS**

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15—New Stearns #1006B, type DS, Magnetic Disc brakes, 135 max. torque ft. lbs. continuous duty for 440 volt service, waterproofed, all for floor or foot mountings, New, Immediate delivery.

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Large stocks, all sizes  
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Converters, Motor Generator Sets, A. C. & D. C. Motors, Control Equipment and Transformers. We build equipment to fit your requirements. Over 25 years engineering background.

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CHARLESTON W. VA.

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### SHASTA DAM SAND AND GRAVEL PLANT AND 10-MILE CONVEYOR EQUIPMENT

Including:  
6000—36" AND 42" IDLERS.  
Pulleys and Drives.  
LATE MODEL 200 HP., 1800 R.P.M.  
GE MOTORS, complete with Starting Equipment.  
Western Gear Reducers, 200 HP., 40 to 1 Ratio.  
8 x 12 MARCY ROD MILL.  
Dorr Hydroseparator.  
30" Tripper and Trestle.  
Merrick Weightometer.  
All Types of Pumps, complete with Drives.  
42" Pendulum Boom Conveyors, 100' and 200'.  
Electric Line Equipment, Transformers, Motors and Supplies.  
Other Miscellaneous Contractors' Equipment.

Subject to Prior Sale

Write, Wire or Telephone Redding 1440  
**COLUMBIA CONSTRUCTION CO., INC.**  
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### FOR SALE

2 Goodman G-20 Shaker Conveyors with pans;

2 Goodman 90-L Elevating Conveyors:  
**Immediate Delivery**

**WEST VIRGINIA MINE SUPPLY CO.**  
Clarksburg, W. Va.

### FOR SALE

## TURBINE GENERATOR

Steam Terry, Type C-2, Serial #19031  
500 KW. Steam Pressure 175 lbs. back pressure 18 lbs. 1800 RPM with lubricating oil pump for force lubrication to governor and throttle control.

### GLAZER STEEL CORP.

610 Chamberlain St., Knoxville, Tenn.  
Phone 3-0738

# CALL MOORHEAD

**In Pittsburgh  
FOR REBUILT MINING EQUIPMENT**

### MINING MACHINES

2-212 G3 Goodman AC Low Vein Shortwall.  
CE 7 Sullivan 250 v. 6" bar, any gauge.  
3-35 B Jeffrey 250 v. Permissible.  
3-35-B Jeffrey 500 v. Permissible.  
12 A Goodman 35 HP 250 v. 6" Bar.  
12DA Goodman 50 HP 250 v. 6" bar.  
2-35L Jeffrey Low Vein 6" AC Shortwall.

### STORAGE BATTERY LOCOMOTIVES

3-6 Ton G.E., permissible 36/44" Ga. HM 825 BB  
Motors. 2 with Edison Batteries.  
Haulage & Gathering Locomotives.  
4 Ton 36" Ga. Atlas 2 BB Motors.

### Haulage & Gathering Locomotives

13 Ton Westgh. 250 c. 36" or 40" Ga.  
13 Ton Westgh. Bar Steel 500 v. 40/42".  
2-13 Ton G.E. 5" armorplate 500 v. 44" Ga.  
10 Ton Jeffrey MH 110, 250 v. 36/42" Ga.

### COAL CRUSHERS

18 x 24 and 18 x 30 New Scottsdale dbl. roll.

### AIR COMPRESSORS

1300 cu. ft. 100# Pres. Worthington 2 stage Belted.  
9" x 8" Sullivan Portable—motor driven.

### REDUCTION UNITS

500 HP Morse ratio 4.28 to 1.  
250 HP Ottunwa ratio 12.7 to 7.  
2-40 HP Ohio Forge ratio 45 to 1.

**MOORHEAD-REITMEYER CO., INC.**

### AUTOMATIC RECLOSING BREAKERS

400 amp. Type ARL breaker.  
600 amp. Type MSB breaker.  
800 amp. Type ADHX breaker.  
1200 amp. Type MSB breaker.  
2000 amp. Type DHDX breaker.

### Rotary Con. & MG Sets (3 ph. 60 cy.)

500 KW West Rotary Converter 275 v. 6 phase 1200  
RPM with transformers and switchboard.  
300 KW G.E. HC 12 Rotary 275 v. 6 ph.  
150 KW Ridgway 275 v. 900 RPM dir. con. 225 HP.  
75 KW West. Elec. 250 v.—2200 v. 900 RPM.  
50 KW G.E. 125 v.—75 HP West. 220/440.

### SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
500	G.E.	450	S.R.	MT 412
350	Al. Ch.	720	S.R.	M
350	G.E.	900	S.R.	I-M
300	G.E.	700	S.R.	M
300	West.	1750	S.R.	CW
200	G.E.	240	S.R.	MT 412
200	G.E.	600	S.R.	I-M
150	West.	600	S.C.	Syn.
100	West.	1750	S.R.	C-1
100	G.E.	500	S.R.	M 1-25 cy.
100	G.E.	1200	S.C.	KF
100	G.E.	720	S.C.	I-K
75 (4)	G.E.	720	S.C.	K
75 (4)	G.E.	600	S.C.	K
60 (4)	G.E.	514	S.C.	K
50 (1)	G.E.	600	S.R.	HI
40 (3)	G.E.	600	S.R.	MT
40	G.E.	900	S.R.	MTC
20 (2)	G.E.	720	S.C.	K

**Mayflower 7900**

### MINE CARS

80-1½ Ton Cars Rollers brgs. low type, 42" Ga.  
**DC Motors and Generators 230/250 V.**

HP	Make	Speed	WDG	Type
175	G.E.	475	ser.	MD 109
150KW	Cr. Wh.	550	cp.	CO 1812
130	G.E.	550	ser.	MD 108
100	G.E.	480	ser.	S
100	West.	625	cp.	S
75KW	West.	1000	cp.	185T
50	Reliance	1500		SK 80L
40	Roth	1500		SK
20	West.	750		CM
15	Cr. Wh.	800	sh.	CC
15	West.	500	cp.	SK 254
7½	G.E.	825		B 254
7½	New West. Vert.	1750	sh.	
3	New G.E.	1150	cp.	

### HOISTS

Lidgerwood slope hoist Drum 42" dia. 36" wide 10"  
flanges with 200 HP G.E. slipring motor.  
100 HP Shaft Hoist—West. S.R. Motor.  
40 HP Lidgerwood sgl. fr. drum geared to 40 HP  
G.E. slip ring 220/440 v. 3 ph. 60 cy. MTC. Rev.  
30 HP Carlin double dr. fr. 13"x18"—5½" flgs.  
10 HP Hoist sgl. fr. dr. 22" Face 12" dia. 7" flgs.

### PUMPS

100 GPM 325' Head F.M. 2" suc. 1½" dia. dir. con.  
15 HP F.M. 220/440 v. 3600 RPM Motor.  
2-400 GPM 170' Head Lea Courtenay 4" suc. 4" Dis.  
500 GPM 135' Head Janesville 4" suc. 3" dia.  
700 GPM 160' Head DeLaval 6" suc. 6" dia.

**Pittsburgh 19, Penna.**

*Serving the Coal Industry for more than a Quarter of Century*

### ROTARY CONVERTERS

500 KW G.E. SYN 275 V., 6 Ph., 60 Cy., 1200  
RPM, Pedestal Type, 2300/4000 V. Transformers.  
500 KW AL-CH SYN. 275 V., 6 Ph., 60 Cy., 1200  
RPM, Pedestal Type, 2300/4000 V. Transformers.  
150 KW WEST. SYN. 275 V., 6 Ph., 60 Cy., 1200  
RPM, Bracket Type, 2300/4000 V. Transformers.

### MOTOR GENERATORS

500 KW G.E. Syn. 275 V., 2300/4000 V., 3 Ph.,  
60 Cy., 900 RPM, Manual Switchgear.  
300 KW G.E., SYN. 600 V., 2300/4000 V., 3 Ph.,  
60 Cy., 1200 RPM, Semi-Automatic Switchgear.  
150 KW G.E. SYN. 275 V., 2300/4000 V., 3 Ph.,  
60 Cy., 900 RPM, Manual Switchgear.  
150 KW G.E. SYN. 600 V., 2300/4000 V., 3 Ph.,  
60 Cy., 1200 RPM, Manual Switchgear.

### LOCOMOTIVES

15-T Gen. Elec. 500 V., 820-A Mts., 36"-42" Ga.  
13-T Westghse., 500 V., 908-C Mts., 36"-42" Ga.  
13-T Westghse., 250 V., 908-C Mts., 36"-44" Ga.  
13-T Goodman, 500 V., 36-B Mts., 36"-42" Ga.  
10-T JEFFREY, 250 V., 110 Mts., 36"-48" Ga.  
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.  
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.  
8-T WESTGHSE., 250 V., 906-C Mts., 36"-44" Ga.  
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.  
6-T WESTGHSE., 250 V., 903-C Mts., 30"-22" Ga.

Each unit listed above is owned by us and  
is available now for immediate purchase.

**WALLACE E. KIRK COMPANY  
INCORPORATED**

501 Grant Building Pittsburgh, Pa.

**FOR SALE  
150 TON RAILROAD SCALE**

Fairbanks Morse  
50 ft. long

**KOVALCHICK SALVAGE CO.  
INDIANA, PA.  
Phone 1964**

## FLORENCE MACHINERY & SUPPLY CO. REBUILT COAL MINING EQUIPMENT

### COAL CUTTERS

4-CE-7 Sullivan, 220 or 440 Volts AC  
1-29-LE Jeffrey, 250 Volts DC, mounted on  
Joy Cars  
1-Goodman Universal, 250 Volts DC  
1-Goodman Standard, 250 Volts DC

### GENERATORS

1-96 KW, 2300 Volts AC, direct connected  
to a 14x17 Chuse Engine  
1-25 KW Crocker-Wheeler, 250 Volts DC  
1-15 KVA Ft. Wayne, 480 Volts AC  
1-100 KVA West. Syn. Motor, 2300 Volts  
AC

### TRANSFORMERS

1-15 KVA Gen. Elec. 480-120/240 Volts  
1-10 KVA West. 440-220-110 Volts  
1-5 KVA West. Sgl. Ph. 440-220/110  
1-3 KVA Gen. Elec. Sgl. Ph. 550-110/220  
Volts

### PIT CARS

105-1 Ton R. B. Card, 36" Ga.  
119-1 Ton P. B. Card, 36" Ga.

### TROLLEY LOCOMOTIVES

1-6 Ton Jeffrey Trolley Locomotive  
1-8 Ton Jeffrey Trolley Locomotive

We have a complete stock of practically everything

Write for Stock List

**904 EQUITABLE BLDG.**

**DENVER 2, COLORADO**

Yards: Denver and Florence

### LOADERS

1-7-BU Joy Loader, 250 Volts DC  
1-Manierre Type Box Car Egg Loader  
1-Manierre Box Car Lump Loader

### ELECTRIC HOISTS

1-200 H.P. Double Drum Shaft Hoist, with  
Motor and Auto. Control Panel  
1-52 H.P. Single Drum, with Motor  
1-25 H.P. Single Drum, with Motor  
1-15 H.P. Single Drum, with Motor  
1-7½ H.P. Single Drum, with Motor

### MISCELLANEOUS

1-No. 8 Clarage Blower-Exhauster, with  
3 H.P. Motor  
4-3 x 4½ Goulds Pyramid Pumps, Mo-  
torized  
1-5 x 5 Deming Oil-Rite Pump, Motorized  
1-3 x 3 Deming Oil-Rite Pump, Motorized  
3-Double Deck Mine Cages  
1-30 H.P. Slip-Ring Motor, 1200 RPM,  
with Controller & Grids  
2-40 H.P. Gen. Elec. Motors, 900 RPM  
1-25 H.P. Gen. Elec. Motor, 900 RPM  
1-15 H.P. West. Motor, 900 RPM  
10-Tons 85# Rail  
Plate Frogs, Switches & Splice Bars

NEW and REBUILT  
STORAGE BATTERY

## LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge

**GREENSBURG MACHINE CO.**

Greensburg, Penna.

### REBUILT MINING EQUIPMENT

#### DOUBLE DRUM HOIST

1-50 HP Lidgerwood Double Drum Hoist,  
drums 24" x 24", good for 5000# RP  
and 4000 ft. of ½" rope, motor driven

**MOTORS - GENERATORS - TRANSFORMERS**

**JOHN D. CRAWBUCK CO. PGH. (12) PA.**



## SEARCHLIGHT SECTION



# RESPIRATORS

**BUREAU  
OF MINES  
APPROVED!**

- A mine safety appliance approved for

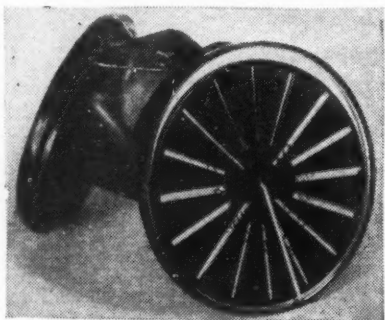
**PNEUMOCONIOSIS  
PRODUCING DUSTS AND  
MISTS AND CHROMIC ACID MISTS**

## NEW A-1 CONDITION

*B/M seal on each Respirator.  
Boxed individually.*



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Model Willson "J750" contains additional filters.

Manufactured by  
**MINE SAFETY APPLIANCE**

Our Price	F.O.B. New York
* COMFO	\$1.25 each
* "J750"	\$1.00 each

Discounts up to 50% on quantity orders

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EQUIPMENT  
COMPANY**

230 EAST 8th STREET, MOUNT VERNON, NEW YORK

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## FOR SALE

Following equipment  
all located at Zap, North Dakota.  
May be inspected at any time.

- 3—Vulcan steam locomotives, 18 ton, 42" gauge
  - 2—Davenport steam locomotives, 21 ton, 42" gauge
  - 1—Whitcomb gas locomotive, 14 ton, 42" gauge
  - 10—18 ton roller bearing steel bottom dump hopper cars, 42" gauge
  - 1—Bucyrus-Erie GA2 shovel 1 1/4 yard coal bucket
  - 1—International TK40 gas caterpillar tractor
  - 1—1/2 yard manganese lip ore shovel bucket
  - 1—1/4 yard manganese lip ore shovel bucket
  - 1—3 yard Daniels Murtaugh dragline rock bucket
  - 1—Atlas Imperial 65 h.p. diesel engine
  - 1—Fairbanks Morse 20 h.p. diesel engine
  - 1—150 h.p. Bros steam boiler
  - 1—Dryer, steam, 100 lbs. pressure, Capacity 20 tons material
- Approximately 325 tons railroad steel, 45 to 90 lbs. Also large quantity angle bars, frogs, switch points, bolts, spikes, etc.

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**DAKOTA COLLIERIES COMPANY**  
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**A. C. MOTORS**

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**AC & DC MOTORS**

35 KWMG Set. Centrifugal Pumps

Agents

**CUTLER HAMMER CONTROLS  
ARMATURE & MOTOR REWINDING**

**UNITED ELECTRIC & MACHINE CO.**

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## 3 Way DUMP CAR and Dumping Frame

TRACK

GAUGE

56 1/2"



**NOW IN  
OPERATION**

Available 90 Days

*Inspection  
Invited*

For further information write or wire  
**THE HUDSON COAL COMPANY**

C. W. Carpenter,

Scranton, 1, Pa.

## FOR SALE

Used Mines Car Trucks 44"  
and 48" Gauge Timken and  
Hyatt Bearings.

200 Used Steel Mine Cars  
End Dump 44" Gauge.

**Immediate Delivery**

**MANSBACH METAL COMPANY**  
Logan, W. Va. Phone 1071

## FOR SALE

**ONE AMERICAN PULVERIZER**

Type A. C. Serial No. 2258  
Complete with V-Belt Sheave  
Excellent condition - Immediate delivery  
**MIDWEST-RADIANT CORPORATION**  
220 North Fourth St., St. Louis, 2, Missouri.

## WESTINGHOUSE

TYPE SK — MOTORS  
America's Best Stock  
WIRE INQUIRIES COLLECT



**MOTORS, GENERATORS,  
TRANSFORMERS  
BOUGHT & SOLD**

For prompt action, wire specifications collect

**ELECTRIC  
EQUIPMENT CO.**

PHONES: GLENWOOD 6783-6784-6785  
63 CURLEW STREET, P.O. BOX 51 • ROCHESTER 1, N.Y.

## FOR SALE

1250 HP/850 KW, McIntosh-Seymour  
Diesel Engine Generator 60/3/2300.

750 HP International Diesel Engine 327  
RPM, 6 cylinders, 16" bore x 20" stroke.

750 HP Superior Diesel Engine 8 cylin-  
der, 4 cycle, 14 1/2" bore x 18" stroke,  
327 RPM.

**GLAZER STEEL CORPORATION**

610 Chamberlain St., Knoxville, Tenn.  
Phone 3-0738

## FOR SALE

2 Sullivan 7 B shortwall undercutters  
1, 50 hp. 440 volt A.C.  
1, 50 hp. 250 volt D.C.

Both with accessories

E. G. KRESS

**Certain-Teed Products Corp.**  
120 S. LaSalle Chicago 3, Ill.

## FOR SALE

100 Sanford Day Drop Bottom Mining  
Cars—36" gauge—Most of these cars in  
good shape—some in need of repairs—  
"Subject to prior sale."

**WERNER LUMBER CO.**  
TRACY CITY, TENN.



## SEARCHLIGHT SECTION



### REBUILT EQUIPMENT—READY TO SHIP

#### MOTOR GENERATOR SETS

- 1—300 KW 600 rpm. 250 v. DC Al. Chal. Gen. dir. driven by 450 HP 2200 v. 3/60 Al. Chal. Syn. Mtr.
- 1—150 KW 1150 rpm. 250 v. DC Westg. Gen. dir. con. to 225 HP 1150 rpm. 440 v. 3 ph. 60 cy. Westg. Motor.
- 1—80 KW 720 rpm. 250 v. DC G.E. Gen. V-belt driven by 150 HP 1800 rpm. 220 or 440 v. 3/60 West. Mtr.
- 1—30 KW 250 v. DC cp. wd. Gen. dir. con. 220/440 v. 3 ph. 60 cy. AC Motor.
- 1—30 KW 250 v. DC 1200 rpm. G.E. Gen. dir. con. to 2200/440/220 v. 3/60 syn. motor.
- 1—20 KW 1150 rpm. 250 v. Westg. Gen. dir. driven by 30 HP 1150 rpm. motor.

#### MINE LOCOMOTIVES

- 1—5 ton Iron-ton Storage Battery Locomotive.

#### PUMPS

- 1—Amer. Piston Pump—5½x4¼"—size 8x12.
- 1—48 GPM 161' hd. Roper 3" suc. 3" dis.
- 1—90 GPM 225 ft. head, 600 rpm. 2x2" Blackmer.
- 1—220 GPM 225 ft. head, 600 rpm. 3¼"x3" Blackmer.
- 2—500 GPM Morris Machine Wks. 4" suc. 4" dis. 123" hd. 1700 rpm.
- 1—2000 GPM DeLaval 170' head.
- 1—3000 GPM DeLaval 144' hd. 150 HP.
- 1—3500 GPM DeLaval 130' hd. 1450 rpm.

#### SLIPPING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
400	Westg.	CW	2200	435
350	Westg.	CW	2200	900
50-60	Westg.	CW	220	1800
50	Chand.		220/440	1800

5	Duquesne	220/440	1200
40-50	Westg.	CW	220/440
15	G.E.	ITC-5009	220
			900

#### 230 V. DC MOTORS

HP	Make	RPM	Type
80	Westg.	490	76A
25	Westg.	600	SK
25	G.E.	650	MD
20	Westg.	600	M
20	Westg.	1750	SK
20	Westg.	975	S
15	Al. Ch.	800	SK
15	Westg.	1700	SK
13½	Al. Chal.	700	
13	Cr. Wh.	1100	CM
10	Cr. Wh.	675	33M
10	Cr. Wh.	825	CM
10	Westg.	1750	RC-11
8	G.E.	950	
7.5	Electro Dynamic	1750	
7	Westg.	750	M
5	Westg.	400	SK
5	Robbins Myers	3400	
5	Westg.	850	
5	Cr. Wh.	980	CM
3½	Westg.	1200	M
3	Robbins Myers	3400	

#### ALTERNATING CURRENT MOTORS

HP	Make	Volts	RPM	Type
150	Wagner	440	1800	31V
100	Westg.	220/440	860	CCL

75	Triumph	220	685	B15
60	Westg.	220-440	1800	CD
50	Westg.	220	1200	
50	Chandeysson	220/440	1800	
50/32	G.E.	440	800/640	POS
30	Westg.	220/440	680	CS
30	West. Elec.	440	1200-1800	
25	Westg.	440	575	CS
25	Westg.	440	1200	CS
20	Westg.	440	860	CS
20	Westg.	220/440	515	CS
15	Triumph	220	1150	
15	Westg.	440	720	CS
5	Westg.	220/440	3485	CS
5	Westg.	220/440	1750	CS
5	G.E.	220	1155	KQ
3	Westg.	220	1200	CS

#### MAGNETIC STARTERS

- 40—NEW, 5, 7½, 10 and 15 HP 230 v. DC Cutler Hammer drip proof Magnetic Starters.

#### TRANSFORMERS

- 1 2 1040/2080 52/104 G.E.
- 1 10 2300/1150 220/110 Westg.
- 1—75 KVA Scott Connected Pittsburgh Transformer. 220 v. two to three phase or three to two phase.

#### COMPRESSORS

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